

SUBCHAPTER R—NAUTICAL SCHOOLS

PART 166—DESIGNATION AND APPROVAL OF NAUTICAL SCHOOL SHIPS

Sec.

166.01 Approval of nautical school ships.

166.05 Course of study for deck students.

166.10 Course of study for engineering students.

166.15 Training for maintenance of discipline; ship sanitation; fire and lifeboat drills.

166.20 Applicants for certificates; when eligible for examination.

AUTHORITY: 46 U.S.C. 2103, 3306, 8105; 46 U.S.C. App. 1295g; 49 CFR 1.46.

SOURCE: CGFR 52-43, 17 FR 9542, Oct. 18, 1952, unless otherwise noted.

§ 166.01 Approval of nautical school ships.

(a) Under 46 U.S.C. 7315, graduation from a nautical school vessel may be substituted for the service requirements for able seaman and qualified member of the engine department endorsements or merchant mariner's documents.

(b) It has been made to appear to the satisfaction of the Commandant that the school ships operated by the States in which they are located; namely, by the California Maritime Academy, Great Lakes Maritime Academy at Northwestern Michigan College, Maine Maritime Academy, Massachusetts Maritime Academy, New York State Maritime College, and Texas Maritime Academy, and by the United States Merchant Marine Academy, the United States Naval Academy, and the United States Coast Guard Academy, have adopted a course of study for their students complying with the rules prescribed by the Commandant, and a system of instruction adequate to equip the deck and engineering students theoretically and physically in the rudiments of seamanship and navigation necessary to qualify the graduates for the rating of "able seamen" and in all branches of marine engineering necessary to qualify the graduates for the rating of "qualified member of the engine department," respectively.

(c) The school ships operated by the State organizations and the Federal academies named in paragraph (b) of this section are hereby approved and their graduates, if meeting the other qualifications required by law and regulations promulgated thereunder, are entitled to the rating of able seamen or qualified members of the engine department and to be certified as such.

(d) A graduate of any of those school ships, if meeting the other qualifications required by law and regulations promulgated thereunder, is also entitled to the rating of lifeboatman and to be certified as such.

[CGFR 52-43, 17 FR 9542, Oct. 18, 1952, as amended by CGD 72-92R, 38 FR 29320, Oct. 24, 1973; CGD 95-028, 62 FR 51216, Sept. 30, 1997]

§ 166.05 Course of study for deck students.

The course of study for deck students shall include (a) all the instructions in the rudiments of seamanship and navigation necessary to equip the student fully with the theoretical knowledge required for the proper discharge of the duties developing upon able seaman; (b) a thorough practical training in the mechanics of all operations incident to the sailing and management of a vessel insofar as such operations form a part of the duties of able seamen.

§ 166.10 Course of study for engineering students.

The course of study for engineering students shall include (a) all the instruction necessary to fully equip the student with the theoretical knowledge required for the proper discharge of the duties developing upon qualified members of the engine department; (b) a thorough practical training in the mechanics of all operations incident to the sailing and management of a vessel insofar as such operations form a part of the duties of qualified members of the engine department.

§ 166.15 Training for maintenance of discipline; ship sanitation; fire and lifeboat drills.

All students shall be trained to obey all lawful orders emanating from their

§ 166.20

superior officers and schooled in the rules of conduct to be observed in order that proper discipline may be maintained on shipboard. They shall also be instructed in the fundamentals of ship sanitation as prescribed by law and regulations, and shall be given intensive instruction and practical training in all the operations incident to fire and lifeboat drills, both in port and at sea.

§ 166.20 Applicants for certificates; when eligible for examination.

Applicants for certificates as able seamen will be eligible for examination after they have completed a course of study as outlined in §§ 166.05, 166.15, and applicants for certificates as qualified members of the engine department after they have completed a course of study as outlined in §§ 166.10, 166.15.

PART 167—PUBLIC NAUTICAL SCHOOL SHIPS

Subpart 167.01—General Provisions

Sec.

- 167.01-1 Basis and purpose of part.
- 167.01-5 Application of regulations.
- 167.01-7 Ocean or unlimited coastwise vessels on inland and Great Lakes routes.
- 167.01-8 Inspection of school ships using gross tonnage criterion.
- 167.01-10 Effective date of regulations.
- 167.01-15 Specifications for articles or materials.
- 167.01-20 OMB control numbers assigned pursuant to the Paperwork Reduction Act.

Subpart 167.05—Definitions

- 167.05-1 Definition of terms.
- 167.05-5 Approved.
- 167.05-10 Commandant.
- 167.05-15 Coast Guard District Commander.
- 167.05-20 Marine inspector or inspector.
- 167.05-25 Nautical school ship.
- 167.05-30 Officer in Charge, Marine Inspection.
- 167.05-35 Public nautical school.

Subpart 167.10—Enforcement and Right of Appeal

- 167.10-1 Enforcement.
- 167.10-50 Right of appeal.

Subpart 167.15—Inspections

- 167.15-1 Inspections required.
- 167.15-5 Authority of marine inspectors.

46 CFR Ch. I (10-1-98 Edition)

- 167.15-10 Application for annual inspection.
- 167.15-15 Application for inspection of a new nautical school ship or a conversion of a vessel to a nautical school ship.
- 167.15-20 Inspections of nautical school ships.
- 167.15-25 Inspection standards for hulls, boilers and machinery.
- 167.15-27 Definitions relating to hull examinations.
- 167.15-28 Inspection of lifesaving appliances and arrangements.
- 167.15-30 Drydock examination and internal structural examination intervals.
- 167.15-35 Notice and plans required.
- 167.15-40 Integral fuel oil tank examinations—T/ALL.
- 167.15-50 Tailshaft examinations.

Subpart 167.20—Hull Requirements, Construction and Arrangement of Nautical School Ships

- 167.20-1 Construction.
- 167.20-7 Subdivision and stability.
- 167.20-10 Means of escape.
- 167.20-15 Scupper, sanitary and similar discharges.
- 167.20-17 Bilge pumps, bilge piping and sounding arrangements.
- 167.20-35 Liquid ballast.

Subpart 167.25—Marine Engineering

- 167.25-1 Boilers, pressure vessels, piping and appurtenances.
- 167.25-5 Inspection of boilers, pressure vessels, piping and appurtenances.

Subpart 167.30—Repairs or Alterations

- 167.30-1 Notice of repairs or alterations required.
- 167.30-5 Proceeding to another port for repairs.
- 167.30-10 Special operating requirements.

Subpart 167.35—Lifesaving Equipment

- 167.35-1 General.

Subpart 167.40—Certain Equipment Requirements

- 167.40-1 Electrical installations.
- 167.40-5 Alarm bells.
- 167.40-7 Voice tubes, telephone, and telegraph systems.
- 167.40-20 Deep-sea sounding apparatus.
- 167.40-25 Signaling lamp.
- 167.40-30 Guards and rails.
- 167.40-40 Radar.
- 167.40-45 Magnetic compass and gyro-compass.

Subpart 167.43—Work Vests

- 167.43-1 Application.

Coast Guard, DOT

§ 167.01-5

- 167.43-5 Approved types of work vests.
- 167.43-10 Use.
- 167.43-15 Shipboard stowage.
- 167.43-20 Shipboard inspections.
- 167.43-25 Additional requirements for hybrid work vests.

Subpart 167.45—Special Firefighting and Fire Prevention Requirements

- 167.45-1 Steam, carbon dioxide, and halon fire extinguishing systems.
- 167.45-5 Steam fire pumps or their equivalent.
- 167.45-10 Couplings on fire hose.
- 167.45-15 Capacity of pipes and hose.
- 167.45-20 Examination and testing of pumps and fire-extinguishing equipment.
- 167.45-25 Fire mains and hose connections.
- 167.45-30 Use of approved fire-fighting equipment.
- 167.45-40 Fire-fighting equipment on nautical school ships using oil as fuel.
- 167.45-45 Carbon dioxide fire-extinguishing system requirements.
- 167.45-50 Foam smothering system requirements.
- 167.45-60 Emergency breathing apparatus and flame safety lamps.
- 167.45-65 Portable fire extinguishers in accommodation spaces.
- 167.45-70 Portable fire extinguishers, general requirements.
- 167.45-75 Fire extinguishers for emergency powerplants.
- 167.45-80 Fire axes.

Subpart 167.50—Accommodations

- 167.50-1 Hospital accommodations.

Subpart 167.55—Special Markings Required

- 167.55-1 Draft marks and draft indicating systems.
- 167.55-5 Marking of fire and emergency equipment.

Subpart 167.60—Certificates of Inspection

- 167.60-1 Issuance by Officer in Charge, Marine Inspection.
- 167.60-5 Period of time for which valid.
- 167.60-10 Exhibition of certificate of inspection.
- 167.60-15 Manning and persons allowed to be carried.

Subpart 167.65—Special Operating Requirements

- 167.65-1 Emergency training, musters, and drills.
- 167.65-5 Flashing the rays of a searchlight or other blinding light.
- 167.65-15 Routing instructions; strict compliance with.

- 167.65-20 Unnecessary whistling.
- 167.65-25 Steering gear tests.
- 167.65-35 Use of auto pilot.
- 167.65-38 Loading doors.
- 167.65-40 Draft.
- 167.65-42 Verification of vessel compliance with applicable stability requirements.
- 167.65-45 Notice to mariners; aids to navigation.
- 167.65-50 Posting placards of lifesaving signals.
- 167.65-60 Examination of boilers and machinery by engineer.
- 167.65-65 Notice and reporting of casualty and voyage records.
- 167.65-70 Reports of accidents, repairs, and unsafe boilers and machinery by engineers.

AUTHORITY: 46 U.S.C. 3306, 6101, 8105; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

SOURCE: CGFR 51-11, 16 FR 3218, Apr. 12, 1951, unless otherwise noted.

Subpart 167.01—General Provisions

§ 167.01-1 Basis and purpose of part.

The rules and regulations in this part are prescribed and apply to public nautical school ships, except vessels of the Navy or Coast Guard. It is the intent of the regulations in this part to provide minimum standards for vessels used as nautical school ships in accordance with the various inspection statutes and to obtain their correct and uniform application. This part is not applicable to civilian nautical school ships.

[CGD 95-028, 62 FR 51216, Sept. 30, 1997]

§ 167.01-5 Application of regulations.

(a) Regulations in this part contain requirements for the design, construction, inspection, lifesaving equipment, firefighting and fire prevention requirements, special operating requirements and number of persons allowed to be carried on nautical school ships.

(b) Vessels owned or chartered by the United States Maritime Administration that may be used by or in connection with any nautical school are not normally considered as merchant vessels of the United States and, therefore, are not documented.

(c) Documented nautical school ships of 500 gross tons or more, on international voyages, shall comply with

§ 167.01-7

the standards of the International Convention for Safety of Life at Sea, 1974, for cargo vessels.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 69-127, 35 FR 9982, June 17, 1970; CGD 90-008, 55 FR 30663, July 26, 1990]

§ 167.01-7 Ocean or unlimited coastwise vessels on inland and Great Lakes routes.

(a) Vessels inspected and certificated for ocean or unlimited coastwise routes shall be considered suitable for navigation insofar as the provisions of this subchapter are concerned on any inland route, including the Great Lakes.

[CGFR 59-10, 24 FR 3240, Apr. 25, 1959]

§ 167.01-8 Inspection of school ships using gross tonnage criterion.

(a) One of the criteria used for invocation of safety standards is the descriptions of school ships by relative sizes in gross tonnages. When it is determined in accordance with § 70.05-20 of this chapter that a particular school ship has a Bureau of Customs' assigned gross register tonnage which is not indicative of the relative physical size of the vessel, the requirements in this part and the manning shall be that applicable to a vessel of the greater relative size.

[CGFR 60-50, 25 FR 7982, Aug. 18, 1960]

§ 167.01-10 Effective date of regulations.

(a) The regulations in this part shall be in effect on and after July 1, 1951: *Provided*, That amendments, revisions, or additions shall become effective 90 days after the date of publication in the FEDERAL REGISTER unless the Commandant shall fix a different time.

(b) Amendments to regulations in this part will not be retroactive in effect unless specifically made so at the time the amendments are issued.

§ 167.01-15 Specifications for articles or materials.

Articles of equipment or materials used in the equipment or the construction of vessels, which conform to the specifications of the Navy or Coast Guard or their approved equivalent, may be accepted.

46 CFR Ch. I (10-1-98 Edition)

§ 167.01-20 OMB control numbers assigned pursuant to the Paperwork Reduction Act.

(a) *Purpose*. This section collects and displays the control numbers assigned to information collection and record-keeping requirements in this subchapter by the Office of Management and Budget (OMB) pursuant to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*). The Coast Guard intends that this section comply with the requirements of 44 U.S.C. 3507(f), which requires that agencies display a current control number assigned by the Director of the OMB for each approved agency information collection requirement.

(b) *Display*.

46 CFR part or section where identified or described	Current OMB control No
§ 167.15-35	2115-0554
§ 167.65-38	2115-0589
§ 167.65-43	2115-0589

[CGD 88-072, 53 FR 34298, Sept. 6, 1988, as amended by CGD 89-037, 57 FR 41824, Sept. 11, 1992]

Subpart 167.05—Definitions

§ 167.05-1 Definition of terms.

Certain terms used in the regulations of this part are defined in this subpart.

§ 167.05-5 Approved.

This term means approved by the Commandant unless otherwise stated.

§ 167.05-10 Commandant.

This term means Commandant of the Coast Guard.

§ 167.05-15 Coast Guard District Commander.

This term means an officer of the Coast Guard designated as such by the Commandant to command all Coast Guard activities within the officer's district, which include the inspections, enforcement, and administration of Subtitle II of Title 46, U.S. Code, Title 46 and Title 33 U.S. Code, and regulations issued under these statutes.

[CGD 95-028, 62 FR 51216, Sept. 30, 1997]

§ 167.05–20 Marine inspector or inspector.

These terms mean any person from the civilian or military branch of the Coast Guard assigned under the superintendence and direction of an Officer in Charge, Marine Inspection, or any other person as may be designated for the performance of duties with respect to the inspections, enforcement, and administration of Subtitle II of Title 46, U.S. Code, Title 46 and Title 33 U.S. Code, and regulations issued under these statutes.

[CGD 95–028, 62 FR 51217, Sept. 30, 1997]

§ 167.05–25 Nautical school ship.

The term *nautical school ship* means a vessel operated by or in connection with a nautical school or an educational institution under Section 13 of the Coast Guard Authorization Act of 1986.

[CGD 84–069, 61 FR 25311, May 20, 1996]

§ 167.05–30 Officer in Charge, Marine Inspection.

This term means any person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who, under the superintendence and direction of the Coast Guard District Commander, is in charge of an inspection zone for the performance of duties with respect to the inspections, enforcement, and administration of Subtitle II of Title 46, U.S. Code, Title 46 and Title 33 U.S. Code, and regulations issued under these statutes.

[CGD 95–028, 62 FR 51217, Sept. 30, 1997]

§ 167.05–35 Public nautical school.

The term *public nautical school* means any school or branch thereof operated by any State or political subdivision thereof or a school operated by the United States Maritime Administration that offers instruction for the primary purpose of training for service in the merchant marine.

[CGD 84–069, 61 FR 25311, May 20, 1996]

Subpart 167.10—Enforcement and Right of Appeal**§ 167.10–1 Enforcement.**

The Officer in Charge, Marine Inspection, is responsible for the performance of duties within the officer's jurisdiction with respect to inspection of nautical school ships.

[CGD 95–028, 62 FR 51217, Sept. 30, 1997]

§ 167.10–50 Right of appeal.

Any person directly affected by a decision or action taken under this part, by or on behalf of the Coast Guard, may appeal therefrom in accordance with subpart 1.03 of this chapter.

[CGD 88–033, 54 FR 50381, Dec. 6, 1989]

Subpart 167.15—Inspections**§ 167.15–1 Inspections required.**

(a) Before a vessel may be used as a nautical school ship, it shall be inspected by the Coast Guard to determine that the hull, boilers, machinery, equipment and appliances comply with the regulations in this part.

(b) Every nautical school ship subject to the regulations in this part shall be inspected annually, or oftener if necessary, by the Coast Guard to determine that the hull, boilers, machinery, equipment and appliances comply with the regulations in this part.

(c) Nautical school ships while laid up and dismantled and out of commission are exempt from any or all inspections required by law or regulations in this part.

§ 167.15–5 Authority of marine inspectors.

Marine inspectors may at any time lawfully inspect any nautical school ship.

§ 167.15–10 Application for annual inspection.

Application in writing for the annual inspection of every nautical school ship required to be inspected by law and the regulations in this part shall be made by the master, owner, or agent to the Officer in Charge, Marine Inspection,

at any local Marine Inspection Office, U.S. Coast Guard, where the nautical school ship may be operating. The application shall be on Form CG 3752, Application for Inspection of U.S. Vessel, which requires information on name and type of vessel, nature of employment and route in which to be operated, place where and date when the vessel may be inspected, and that no other application has been made to any Officer in Charge, Marine Inspection, since the issuance of the last valid certificate of inspection.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 64-19, 29 FR 7361, June 5, 1964]

§ 167.15-15 Application for inspection of a new nautical school ship or a conversion of a vessel to a nautical school ship.

Prior to the commencement of the construction of a new nautical school ship, or a conversion of a vessel to a nautical school ship, application for the approval of contract plans and specifications and for a certificate of inspection shall be made in writing by the owner or agent to the Officer in Charge, Marine Inspection, at the nearest local Marine Inspection Office, U.S. Coast Guard.

§ 167.15-20 Inspections of nautical school ships.

At each annual inspection, or oftener if deemed necessary, the inspector will inspect the hull, boilers, machinery, equipment, and appliances generally for compliance with the regulations in this subpart and in addition will inspect and test certain specific items as specifically set forth in this part.

§ 167.15-25 Inspection standards for hulls, boilers and machinery.

Except as otherwise provided by law or regulations in this subpart, the following standards shall be accepted as standard by the inspectors:

(a) American Bureau of Shipping "Rules for Building and Classing Steel Vessels" regarding the construction of hulls, boilers and machinery in effect on the date of inspection. These rules may be purchased from the American Bureau of Shipping, New York, N.Y.

(b) U. S. Navy Standard Construction Specification in effect on the date of inspection.

(c) U. S. Coast Guard Standard Construction Specification in effect on the date of inspection.

§ 167.15-27 Definitions relating to hull examinations.

As used in this part—

(a) *Drydock examination* means hauling out a vessel or placing a vessel in a drydock or slipway for an examination of all accessible parts of the vessel's underwater body and all through-hull fittings, sea chests, sea valves, sea strainers, and valves for the emergency bilge suction.

(b) *Internal structural examination* means an examination of the vessel while afloat or in drydock and consists of a complete examination of the vessel's main strength members, including the major internal framing, the hull plating, voids, and ballast tanks, but not including cargo or fuel oil tanks.

[CGD 84-024, 52 FR 39655, Oct. 23, 1987, as amended at 53 FR 32232, Aug. 24, 1988]

§ 167.15-28 Inspection of lifesaving appliances and arrangements.

The inspection of lifesaving appliances and arrangements must be in accordance with the requirements for special purpose vessels in subchapter W (Lifesaving Appliances and Arrangements) of this chapter.

[CGD 84-069, 61 FR 25311, May 20, 1996]

§ 167.15-30 Drydock examination and internal structural examination intervals.

(a) Except as provided for in paragraphs (b) through (e) of this section, each vessel must undergo drydock and internal structural examinations as follows:

(1) Vessels that operate in salt water must undergo two drydock and two internal structural examinations within any five year period. No more than three years may elapse between any two examinations.

(2) Vessels that operate in fresh water at least six months in every 12 month period since the last drydock examination must undergo drydock and internal structural examinations at intervals not to exceed five years.

(b) Vessels with wooden hulls must undergo two drydock and two internal structural examinations within any five year period regardless of the type of water in which they operate. No more than three years may elapse between any two examinations.

(c) If, during an internal structural examination damage or deterioration to the hull plating or structural members is discovered, the Officer in Charge, Marine Inspection, may require the vessel to be drydocked or otherwise taken out of service to further assess the extent of the damage and to effect permanent repairs.

(d) Each vessel which has not met with the applicable examination schedules in paragraphs (a) through (c) of this section because it is on a voyage, must undergo the required examinations upon completion of the voyage.

(e) The Commandant (G-MOC) may authorize extensions to the examination intervals specified in paragraphs (a) and (b) of this section.

[CGD 84-024, 52 FR 39655, Oct. 23, 1987, as amended at 53 FR 32232, Aug. 24, 1988; CGD 95-072, 60 FR 50467, Sept. 29, 1995; CGD 96-041, 61 FR 50734, Sept. 27, 1996]

§ 167.15-35 Notice and plans required.

(a) The master, owner, operator, or agent of the vessel shall notify the Officer in Charge, Marine Inspection, whenever the vessel is to be drydocked regardless of the reason for drydocking.

(b) Each vessel, except barges, that holds a Load Line Certificate must have on board a plan showing the vessel's scantlings. This plan must be made available to the Coast Guard marine inspector whenever the vessel undergoes a drydock examination or internal structural examination or whenever repairs are made to the vessel's hull.

(c) Each barge that holds a Load Line Certificate must have a plan showing the barge's scantlings. The plan need not be maintained on board the barge but must be made available to the Coast Guard marine inspector whenever the barge undergoes a drydock examination or internal structural exam-

ination or whenever repairs are made to the barge's hull.

[CGD 84-024, 52 FR 39655, Oct. 23, 1987]

§ 167.15-40 Integral fuel oil tank examinations—T/ALL.

(a) Each fuel oil tank with at least one side integral to the vessel's hull and located within the hull ('integral fuel oil tank') is subject to inspection as provided in this section. The owner or operator of the vessel shall have the tanks cleaned out and gas freed as necessary to permit internal examination of the tank or tanks designated by the marine inspector. The owner or operator shall arrange for an examination of the fuel tanks of each vessel during an internal structural examination at intervals not to exceed five years.

(b) Integral non-double-bottom fuel oil tanks need not be cleaned out and internally examined if the marine inspector is able to determine by external examination that the general condition of the tanks is satisfactory.

(c) Double-bottom fuel oil tanks on vessels less than 10 years of age need not be cleaned out and internally examined if the marine inspector is able to determine by external examination that the general condition of the tanks is satisfactory.

(d) Double-bottom fuel oil tanks on vessels 10 years of age or older but less than 15 years of age need not be cleaned out and internally examined if the marine inspector is able to determine by internal examination of at least one forward double-bottom fuel oil tank, and by external examination of all other double-bottom fuel oil tanks on the vessel, that the general condition of the tanks is satisfactory.

(e) All double-bottom fuel oil tanks on vessels 15 years of age or older need not be cleaned out and internally examined if the marine inspector is able to determine by internal examination of at least one forward, one amidships, and one aft double-bottom fuel oil tank, and by external examination of all other double-bottom fuel oil tanks on the vessel, that the general condition of the tanks is satisfactory.

[CGD 84-024, 52 FR 39655, Oct. 23, 1987, as amended at 53 FR 32232, Aug. 24, 1988]

§ 167.15–50

§ 167.15–50 Tailshaft examinations.

Tailshaft examinations on nautical school ships must conform with the examination requirements in part 61 of this chapter.

[CGD 84–024, 52 FR 39655, Oct. 23, 1987]

Subpart 167.20—Hull Requirements, Construction and Arrangement of Nautical School Ships

§ 167.20–1 Construction.

Except as otherwise provided by law or regulations in this subpart, the following standards for construction are acceptable.

(a) American Bureau of Shipping “Rules for Building and Classing Steel Vessels” regarding the construction of hulls, boilers and machinery in effect on the date of inspection. These rules may be purchased from the American Bureau of Shipping, New York, N.Y.

(b) U. S. Navy Standard Construction Specification in effect on the date of inspection.

(c) U. S. Coast Guard Standard Construction Specification in effect on the date of inspection.

§ 167.20–7 Subdivision and stability.

Each vessel must meet the applicable requirements in Subchapter S of this chapter.

[CGD 79–023, 48 FR 51010, Nov. 4, 1983]

§ 167.20–10 Means of escape.

(a) On all nautical school ships where the arrangements will possibly permit, all inclosures where persons may be quartered, or where anyone may be employed, shall be provided with not less than two avenues of escape, so located that if one of such avenues is not available another may be.

§ 167.20–15 Scupper, sanitary and similar discharges.

(a) All scupper, sanitary, and other similar discharges which lead through the ship's hull shall be fitted with efficient means for preventing the ingress of water in the event of a fracture of such pipes. The requirements do not apply to the discharges in the machin-

46 CFR Ch. I (10–1–98 Edition)

ery space connected with the main and auxiliary engines, pumps, etc.

§ 167.20–17 Bilge pumps, bilge piping and sounding arrangements.

The number, capacity, and arrangement of bilge pumps and bilge piping shall be in accordance with the requirements for cargo vessels contained in parts 50 to 61 of Subchapter F (Marine Engineering) of this chapter. Sounding pipes shall be fitted in each compartment, except those accessible at all times. The main and secondary drain systems installed in accordance with U.S. Navy or U.S. Coast Guard Construction Specifications shall be accepted as meeting the intent of this section.

[CGFR 52–43, 17 FR 9542, Oct. 18, 1952]

§ 167.20–35 Liquid ballast.

When water ballasting of fuel tanks is necessary, such oily ballast shall not be subsequently discharged overboard within any of the prohibited zones as defined by the Oil Pollution Act, 1961 (33 U.S.C. 1011), except through oily water separators which meet the requirements in 33 CFR 155.330 through 155.380, or directly into sludge barges or shore facilities, or other approved means.

[CGFR 62–17, 27 FR 9046, Sept. 11, 1962, as amended by CGD 95–072, 60 FR 50468, Sept. 29, 1995]

Subpart 167.25—Marine Engineering

§ 167.25–1 Boilers, pressure vessels, piping and appurtenances.

(a) Except as otherwise provided by law or regulations in this subpart, all vessels constructed or reconverted to use as nautical school ships on or after July 1, 1951, shall conform with one of the following standards for boilers, pressure vessels, piping and appurtenances:

(1) Marine engineering regulations in parts 50 to 63, inclusive, of Subchapter F (Marine Engineering) of this chapter.

(2) Navy Standard Construction Specifications in effect at time of construction or conversion.

(3) U.S. Coast Guard Standard Construction Specifications in effect at time of construction or conversion.

(b) The boilers, pressure vessels, and appurtenances shall be inspected initially under the provisions of part 52 of Subchapter F (Marine Engineering) of this chapter. All alterations, replacements or repairs on nautical school ships shall conform to the applicable standards in paragraph (a) of this section insofar as practicable.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 68-82, 33 FR 18908, Dec. 18, 1968]

§ 167.25-5 Inspection of boilers, pressure vessels, piping and appurtenances.

The inspection of boilers, pressure vessels, piping and appurtenances shall be in accordance with the applicable regulations in parts 50 to 63, inclusive, of Subchapter F (Marine Engineering) of this chapter, insofar as they relate to tests and inspection of cargo vessels.

[CGFR 68-82, 33 FR 18908, Dec. 18, 1968]

Subpart 167.30—Repairs or Alterations

§ 167.30-1 Notice of repairs or alterations required.

(a) It shall be the duty of the master, owner, or agent to notify the nearest Officer in Charge, Marine Inspection, whenever repairs or alterations are required, or will be made on a nautical school ship.

(b) Whenever a nautical school ship is placed upon the dock, it shall be the duty of the master, owner or agent to report the same to the Officer in Charge, Marine Inspection, so that a thorough inspection may be made by the Coast Guard to determine what is necessary to make such a nautical school ship seaworthy, if the condition or age of the nautical school ship, in the judgment of the Officer in Charge, Marine Inspection, renders such examination necessary.

§ 167.30-5 Proceeding to another port for repairs.

(a) The Officer in Charge, Marine Inspection, may issue a permit to proceed to another port for repairs, if in his

judgment it can be done with safety. In the issuance of such a permit the Officer in Charge, Marine Inspection, will state upon its face, the conditions upon which it is granted.

(b) When a nautical school ship obtains a permit from the Officer in Charge, Marine Inspection, to go to another port for repairs, the Officer in Charge, Marine Inspection, shall so notify the Coast Guard District Commander, and state the repairs to be made. The Coast Guard District Commander shall notify the Coast Guard District Commander of the district where such repairs are to be made, furnishing him a copy of the report indicating the repairs ordered.

§ 167.30-10 Special operating requirements.

Inspection and testing required when making alterations, repairs, or other such operations involving riveting, welding, burning, or like fire-producing actions are as follows:

(a) The provisions of "Standard for the Control of Gas Hazards on Vessels to be Repaired", NFPA No. 306, published by National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269 shall be used as a guide in conducting the inspections and issuance of certificates required by this section.

(b) Until an inspection has been made to determine that such operation can be undertaken with safety, no alterations, repairs, or other such operations involving riveting, welding, burning, or like fire-producing actions shall be made:

(1) Within or on the boundaries of cargo tanks which have been used to carry combustible liquids or chemicals in bulk; or,

(2) Within spaces adjacent to cargo tanks which have been used to carry Grade D combustible liquid cargo, except where the distance between such cargo tanks and the work to be performed is not less than twenty-five (25) feet; or,

(3) Within or on the boundaries of fuel tanks; or,

(4) To pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(c) Such inspections shall be made and evidenced as follows:

(1) In ports or places in the United States or its territories and possessions, the inspection shall be made by a marine chemist certificated by the National Fire Protection Association; however, if the services of such certified marine chemist are not reasonably available, the Officer in Charge, Marine Inspection, upon the recommendation of the vessel owner and his contractor or their representative, shall select a person who, in the case of an individual vessel, shall be authorized to make such inspection. If the inspection indicates that such operations can be undertaken with safety, a certificate setting forth the fact in writing and qualified as may be required, shall be issued by the certified marine chemist or the authorized person before the work is started. Such qualifications shall include any requirements, as may be deemed necessary to maintain, insofar as can reasonably be done, the safe conditions in the spaces certified throughout the operation and shall include such additional tests and certifications as considered required. Such qualifications and requirements shall include precautions necessary to eliminate or minimize hazards that may be present from protective coatings or residues from cargoes.

(2) When not in such a port or place, and a marine chemist or such person authorized by the Officer in Charge, Marine Inspection, is not reasonably available, the inspection shall be made by the senior officer present and a proper entry shall be made in the vessel's logbook.

(d) It shall be the responsibility of the senior officer present to secure copies of certificates issued by the certified marine chemist or such person authorized by the Officer in Charge, Marine Inspection. It shall be the responsibility of the senior officer present, insofar as the persons under his control are concerned, to maintain a safe condition on the vessel by full observance of all qualifications and requirements listed by the marine chemist in the certificate.

[CGFR 64-19, 29 FR 7361, June 5, 1964, as amended by CGD 95-072, 60 FR 50468, Sept. 29, 1995]

Subpart 167.35—Lifesaving Equipment

§ 167.35-1 General.

Lifesaving appliances and arrangements on nautical school ships must be in accordance with the requirements for special purpose vessels in subchapter W (Lifesaving Appliances and Arrangements) of this chapter.

[CGD 84-069, 61 FR 25311, May 20, 1996]

Subpart 167.40—Certain Equipment Requirements

§ 167.40-1 Electrical installations.

(a) Except as otherwise provided by law or regulation in this part, the electrical equipment may be considered acceptable if it complies with the requirements covered by any one of the following:

(1) U.S. Navy Standard Construction Specifications currently in effect.

(2) U. S. Coast Guard electrical engineering requirements in Subchapter J (Electrical Engineering) of this chapter.

(3) American Institute of Electrical Engineers Standard No. 45, 1945 or 1948 Revision. These standards may be purchased from the American Institute of Electrical Engineers, New York, N. Y.

(b) Changes or alterations in the electrical installations of vessels now in service shall be in accordance with standards set forth in paragraph (a) of this section.

(c) Special attention shall be given by the inspectors in the examination of present installation to see that it is of such nature as to preclude any danger of fire, giving particular attention to wiring which is carried through wooden bulkheads, partitions, etc.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 52-43, 17 FR 9543, Oct. 18, 1952]

§ 167.40-5 Alarm bells.

All nautical school ships over 100 gross tons shall have all sleeping accommodations, public spaces, and machinery spaces equipped with a sufficient number of alarm bells so located as to warn all occupants. The system shall operate from a continuous source of electric energy capable of supplying

Coast Guard, DOT

§ 167.40–45

the system for a period of at least 8 hours without being dependent upon the main, auxiliary or emergency generating plants. Each bell shall produce a signal of a tone distinct from that of other bell signals in the vicinity and shall be independently fused, with each of these fuses located above the bulkhead deck. The bells shall be controlled by a manually-operated contact maker located in the pilothouse. The characteristics of the contact maker shall be such that it possesses:

- (a) Positive contact;
- (b) Watertightness (when located in open spaces subject to weather);
- (c) Means whereby its electrically open or closed position can be determined by sense of touch;
- (d) Means to affect a make-or-break circuit for signaling; and
- (e) Self-maintaining contacts.

§ 167.40–7 Voice tubes, telephone, and telegraph systems.

(a) Each nautical school ship shall be fitted with an efficient means of communication between the pilothouse and engine room. This may be by bell signals with voice tubes, telephone, or telegraph systems.

(b) A voice tube or telephone system between the radio room and the navigating bridge shall be provided when the nautical school ship is equipped with a radio installation.

(c) A voice tube or telephone system between the pilothouse and emergency steering station shall be provided when the nautical school ship is equipped with an emergency steering station.

§ 167.40–20 Deep-sea sounding apparatus.

Nautical school ships shall be equipped with an efficient or electronic deep-sea sounding apparatus. The electronic deep-sea sounding apparatus required shall be installed, kept in working order, and ready for immediate use.

[CGFR 58–10, 23 FR 4686, June 26, 1958, as amended by CGD 75–074, 42 FR 5964, Jan. 31, 1977; CGD 95–027, 61 FR 26010, May 23, 1996]

§ 167.40–25 Signaling lamp.

Nautical school ships of over 150 gross tons shall be equipped with an efficient signaling lamp. This lamp shall be permanently fixed above the bridge

and equipped with a Fresnel lens and high-speed bulb, operated by a weather-proof key, fitted with a suitable condenser. The lamp shall be so connected that it can be operated from the normal source of the nautical school ship's current, the emergency source, and other emergency batteries if provided.

§ 167.40–30 Guards and rails.

On nautical school ships all exposed and dangerous places, such as gears and machinery shall be properly protected with covers, guards, or rails, in order that the danger of accidents may be minimized. On nautical school ships equipped with radio (wireless) the lead-ins shall be efficiently incased or insulated to insure the protection of persons from accidental shock. Such lead-ins shall be located so as not to interfere with the launching of lifeboats and life rafts.

§ 167.40–40 Radar.

All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a marine radar system for surface navigation. Facilities for plotting radar readings must be provided on the bridge.

[CGFR 75–074, 42 FR 5964, Jan. 31, 1977]

§ 167.40–45 Magnetic compass and gyrocompass.

(a) All mechanically propelled vessels in ocean or coastwise service must be fitted with a magnetic compass.

(b) All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a gyrocompass in addition to the magnetic compass.

(c) Each vessel must have an illuminated repeater for the gyrocompass required under paragraph (b) of this section that is at the main steering stand unless the gyrocompass is illuminated and is at the main steering stand.

[CFD 75–074, 42 FR 5964, Jan. 31, 1977]

Subpart 167.43—Work Vests

SOURCE: CGFR 59–22, 24 FR 4962, June 18, 1959, unless otherwise noted.

§ 167.43-1 Application.

(a) Provisions of this subpart shall apply to all vessels inspected and certificated in accordance with this subchapter.

§ 167.43-5 Approved types of work vests.

(a) Each buoyant work vest carried under the permissive authority of this section must be approved under—

- (1) Subpart 160.053 of this chapter; or
- (2) Subpart 160.077 of this chapter as a commercial hybrid PFD.

[CGD 78-174A, 51 FR 4351, Feb. 4, 1986]

§ 167.43-10 Use.

(a) Approved buoyant work vests are considered to be items of safety apparel and may be carried aboard vessels to be worn by crew members when working near or over the water under favorable working conditions. They shall be used under the supervision and control of designated ship's officers. When carried, such vests shall not be accepted in lieu of any portion of the required number of approved life preservers and shall not be substituted for the approved life preservers required to be worn during drills and emergencies.

§ 167.43-15 Shipboard stowage.

(a) The approved buoyant work vests shall be stowed separately from the regular stowage of approved life preservers.

(b) The locations for the stowage of work vests shall be such as not to be easily confused with that for approved life preservers.

§ 167.43-20 Shipboard inspections.

(a) Each work vest shall be subject to examination by a marine inspector to determine its serviceability. If found to be satisfactory, it may be continued in service, but shall not be stamped by a marine inspector with a Coast Guard stamp. If a work vest is found not to be in a serviceable condition, then such work vest shall be removed from the vessel. If a work vest is beyond repair, it shall be destroyed or mutilated in the presence of a marine inspector so as to prevent its continued use as a work vest.

§ 167.43-25 Additional requirements for hybrid work vests.

(a) In addition to the other requirements in this subpart, commercial hybrid PFD's must be—

- (1) Used, stowed, and maintained in accordance with the procedures set out in the manual required for these devices by § 160.077-29 of this chapter and any limitations(s) marked on them; and
- (2) Of the same or similar design and have the same method of operation as each other hybrid PFD carried on board.

[CGD 78-174A, 51 FR 4351, Feb. 4, 1986]

Subpart 167.45—Special Firefighting and Fire Prevention Requirements

§ 167.45-1 Steam, carbon dioxide, and halon fire extinguishing systems.

(a) *General requirements.* (1) Nautical school ships shall be provided with an inert-gas fire-extinguishing system when required.

(2) All nautical school ships carrying combustible cargo in the holds, between decks, or other closed cargo compartments shall be equipped with means for extinguishing fire in such compartments by the use of any inert-gas fire-extinguishing system approved by the Coast Guard or Navy. However, in specific cases where by reason of the design, such compartments are normally accessible and considered to be part of the working or living quarters, a water sprinkling system may be installed in lieu of an inert-gas fire-extinguishing system. On such vessels contracted for prior to January 1, 1962, a steam smothering system may be accepted in lieu of the inert gas system for the protection of cargo holds, paint lockers, and similar spaces. However, although existing steam smothering systems may be repaired, replaced, or extended, no new systems contracted for on or after January 1, 1962, will be permitted.

(3) Cabinets, boxes, or casings inclosing manifolds or valves shall be distinctly marked in painted letters about 3 inches in height, "Steam Fire Apparatus," or "CO₂ Fire Apparatus," as the case may be.

(4) Steam or gas piping fitted for extinguishing fire shall not be used for any other purpose except that it may be used for fire-detecting purposes.

(5) Pipes for conveying steam from the boilers for the purpose of extinguishing fire shall not be led into the cabins, other living spaces, or working spaces. Pipes for conveying carbon dioxide or other extinguishing vapors for the purpose of extinguishing fire shall not be led into the cabins or other living spaces.

(6) Steam smothering lines shall be tested with at least 50 pounds air pressure with ends of the smothering lines capped, or by blowing steam through the lines, and a survey made for detecting corrosion and defects, using the hammer test or such other means as may be necessary.

(7) At annual inspections, all carbon dioxide (CO₂) cylinders, whether fixed or portable, shall be examined externally and replaced if excessive corrosion is found; and all cylinders shall also be checked by weighing to determine contents and if found to be more than 10 percent under required contents of carbon dioxide, the same shall be recharged.

(8) Carbon dioxide and halon cylinders carried on board nautical school ships must be tested and marked in accordance with the requirements of §§ 147.60 and 147.65 of this chapter.

(9) Regarding the limitations on the use of steam smothering in subparagraph (2) of this paragraph, this does not preclude the introduction of steam into such confined spaces as boiler casings or into tanks for steaming out purposes. Such installations are not to be considered as part of any required fire extinguishing system.

(b) *Steam systems.* (1) As noted in subparagraph (a)(2) of this section, steam smothering systems are not permitted on nautical school ships contracted for on or after January 1, 1962, nor for new installations on vessels contracted for prior to that date. Where steam smothering systems are installed, the provisions of this paragraph shall be met.

(2) Steam for fire-extinguishing systems shall be available at a suitable pressure from the main boilers or a donkey or auxiliary boiler.

(3) The pipe lines shall be led from not more than three stations in easily accessible locations on the weather deck to each cargo hold, cargo 'tween-decks, or other closed cargo compartments, and to each cargo-oil deep tank, lamp locker, oil room, and like compartments, which lamp locker, oil room, and like compartments, shall be wholly and tightly lined with metal. The steam connections to the lamp lockers, oil rooms, and like compartments may be taken from the nearest steam supply line, independent of the extinguishing manifolds. In lamp lockers, oil rooms, and like compartments, adequate means may be provided for ventilation if suitable dampers capable of being operated from outside the spaces are fitted in each vent duct.

(4) Each pipe in the extinguishing manifolds shall be fitted with a shut-off valve plainly and permanently marked to indicate into which compartment it discharges. This requirement also applies to independent extinguishing lines.

(5) Manifold steam supply pipes shall be fitted with master valves at the manifolds, and provision shall be made for draining the manifold and individual lines to protect them against freezing. If the manifolds are located on an open deck, they shall be enclosed in a metal box.

(6) The minimum diameter of any steam fire-extinguishing pipe to a cargo hold, cargo 'tween-decks, other closed cargo compartments, or cargo-oil deep tank shall be one inch, the size and number of pipes to be governed by the size of the compartment. The minimum diameter of any steam fire-extinguishing pipe to a lamp locker, oil room, or like compartments, shall be three-fourths of an inch.

(c) *Inert-gas systems.* (1) When a carbon dioxide (CO₂) smothering system is fitted in the cargo hold, cargo 'tween-decks, or other closed cargo compartments, or cargo-oil deep tanks, the quantity of carbon dioxide shall be sufficient to give a gas saturation of 30 percent of the gross volume of the largest cargo hold. The quantity in pounds of carbon dioxide required may be determined approximately by the following formula:

$$W = \frac{L \times B \times D}{30} \quad (1)$$

where:

W=the weight of CO₂ required, in pounds.

L=the length of the hold, in feet.

B=the mean breadth of the hold, in feet.

D=the depth from tank top or flat forming lower boundary to top of uppermost space in which freight may be carried, in feet.

(2) When a carbon dioxide (CO₂) smothering system is fitted in the lamp locker, oil room, or like compartments, the quantity in pounds of carbon dioxide required may be determined by dividing the gross volume of the space by a factor of 22. Lamp lockers, oil rooms, and like compartments, in all classes of vessels, shall be wholly and tightly lined with metal. The whole charge of gas shall be capable of being released simultaneously by operating one valve and control, and all cylinders shall be completely discharged in not more than two minutes.

(3) Pipes used for supplying carbon dioxide to the cargo holds, cargo 'tween-decks, other closed cargo compartments, and cargo-oil deep tanks shall be not less than three-fourths inch inside diameter. Pipes used for supplying carbon dioxide to lamp lockers, oil rooms, and like compartments shall not be less than one-half inch inside diameter.

(4) The control(s) releasing the inert gas shall be located in a position(s) outside the space(s) protected and shall be readily accessible when the vessel is being navigated. All valves shall be permanently marked to indicate into which compartment they discharge. A space which is protected by a carbon dioxide extinguishing system, and is normally accessible to crew while the nautical school ship is being navigated shall be fitted with an approved audible alarm in such space, which will be automatically sounded when the carbon dioxide is admitted to the space.

(5) Provisions shall be made to prevent the admission of air into the lower parts of cargo holds, cargo 'tween-decks, and other closed cargo compartments while the inert-gas system is in operation.

(6) Cylinders, piping, and controls for the inert-gas system shall be protected

from damage and shall be securely fastened and supported.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 54-46, 19 FR 8708, Dec. 18, 1954; CGFR 61-15, 26 FR 9303, Sept. 30, 1961; CGFR 65-9, 30 FR 11494, Sept. 8, 1965; CGD 84-044, 53 FR 7752, Mar. 10, 1988]

§167.45-5 Steam fire pumps or their equivalent.

(a) All nautical school ships shall be equipped with fire pumps.

(b) Nautical school ships of 100 gross tons and under shall be equipped with one hand fire pump with a pump-cylinder capacity not less than 100 cubic inches, or a power-driven pump of equivalent discharge capacity.

(c) Nautical school ships over 100 gross tons shall be equipped with fire pumps and piping as follows:

(1) All nautical school ships shall be provided with powerful pumps available for use as fire pumps. When of less than 1,000 gross tons it shall have 1, and when larger it shall have at least 2 independently driven pumps connected to the fire main. Each pump shall be capable of delivering two powerful jets of water simultaneously from the highest outlets on the fire main at a Pitot tube pressure of approximately 50 pounds per square inch.

(2) On oil-burning nautical school ships, where two pumps are required, they may be located in the same compartment, if the compartment is equipped with an approved fixed carbon dioxide extinguishing system.

(d) Outlets from the fire mains shall be of a sufficient number and so arranged that any part of the living quarters, weather decks and any part of cargo decks, accessible to crew, while the nautical school ship is being navigated, may be reached with a single 50-foot length of hose. Outlets within accommodations and service spaces adjacent thereto shall comply with the above or they may be so arranged that any part may be reached with a single 75-foot length of hose provided a siamese connection is fitted at each outlet. Where the fire main is located on an exposed deck, branches shall be provided so that the hose connections necessary to comply with the foregoing be distributed on both sides of the nautical school ship. The fire hose shall be

connected to the outlet at all times, except on open decks where the location of the fire hydrants is such that no protection is afforded for the hose in heavy weather. The fire hose may be temporarily removed from the hydrant when it will interfere with the handling of cargo.

(e) Outlet openings shall have a diameter of not less than 1½ inches and shall be fitted with suitable hose connections and spanners. The arrangement of the fire hydrant shall be limited to any position from the horizontal to the vertical pointing downward, so that the hose will lead downward or horizontally, in order to minimize the possibility of kinking. In no case will a hydrant arranged in a vertical position with the outlet pointing upward be accepted.

(f) Fire pumps shall be fitted on the discharge side with relief valves set to relieve at 25 pounds higher than the pressure necessary to maintain the requirements of paragraph (c)(1) of this section and a pressure gage to indicate the pressure on the fire main. If the fire pumps operating under shut-off conditions are not capable of producing a pressure exceeding 125 pounds per square inch, the relief valve may be omitted.

(g) Each section of fire hose used after January 1, 1980 must be lined commercial fire hose that conforms to Underwriters' Laboratories, Inc. Standard 19 or Federal Specification ZZ-H-451E. Hose that bears the label of Underwriters' Laboratories, Inc. as lined fire hose is accepted as conforming to this requirement. Each section of replacement fire hose or any section of new fire hose placed aboard a vessel after January 1, 1977 must also conform to the specification required by this paragraph.

(h) Each fire hydrant must have at least one length of firehose. Each firehose on the hydrant must have a combination solid stream and water spray firehose nozzle that is approved under subpart 162.027 of this chapter.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 60-36, 25 FR 10642, Nov. 5, 1960; CGD 74-60, 41 FR 43152, Sept. 30, 1976; CGD 76-086, 44 FR 2394, Jan. 11, 1979]

§ 167.45-10 Couplings on fire hose.

The couplings on fire hose shall be of brass, copper, or composition material. All hydrants shall be provided with suitable spanners.

§ 167.45-15 Capacity of pipes and hose.

The capacity of the pipes and hose leading from the pumps shall in no case be less than that of the discharge opening of the pump: *Provided, however,* That the pipe and hose shall in no instance be less than 1½ inches in internal diameter.

§ 167.45-20 Examination and testing of pumps and fire-extinguishing equipment.

The inspectors will examine all pumps, hose, and other fire apparatus and will see that the hose is subjected to a pressure of 100 pounds to the square inch at each annual inspection and that the hose couplings are securely fastened.

§ 167.45-25 Fire mains and hose connections.

All pipes used as mains for conducting water from fire pumps on nautical school ships shall be of steel, wrought iron, brass, or copper with wrought iron brass, or composition hose connections.

§ 167.45-30 Use of approved fire-fighting equipment.

Portable fire extinguishers or fire-extinguishing systems which conform to the specifications of the Navy or Coast Guard, or their approved equivalent, may be accepted for use on nautical school ships.

§ 167.45-40 Fire-fighting equipment on nautical school ships using oil as fuel.

Steam-propelled nautical school ships burning oil for fuel shall be fitted with the fire-fighting equipment of the following type and character:

(a) In each boiler room and in each of the machinery spaces of a nautical school ship propelled by steam, in which a part of the fuel-oil installation is situated, 2 or more approved fire extinguishers of the foam type of not less than 9.5 liters (2½ gallons) each or 2 or more approved fire extinguishers of the

carbon dioxide type of not less than 33 kilograms (15 pounds) each must be placed where accessible and ready for immediate use. On a nautical school ship of 1,000 gross tons and under, only 1 of the fire extinguishers may be required.

(b) In boiler and machinery spaces, at least 2 fire hydrants must have a fire-hose of a length that allows each part of the boiler and machinery spaces to be reached by water from a combination solid stream and water spray fire-hose nozzle.

(c) Each firehose under paragraph (b) of this section must have a combination solid stream and water spray fire-hose nozzle that meets subpart 162.027 of this chapter. Combination nozzles and low-velocity water spray applicators previously approved under subpart 162.027 of this chapter may remain so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection.

(d) On every steam propelled nautical school ship of over 1,000 gross tons having one boiler room there shall be provided one fire extinguisher of the foam type of at least 40 gallons rated capacity or one carbon dioxide (CO₂) extinguisher of at least 100 pounds. If the nautical school ship has more than one boiler room, an extinguisher of the above type shall be provided in each boiler room. On every steam propelled nautical school ship of 1,000 gross tons and under, foam type fire extinguishers of at least 20 gallons rated capacity or carbon dioxide (CO₂) extinguishers of at least 50 pounds shall be used. Extinguishers fitted shall be equipped with suitable hose and nozzles on reels or other practicable means easy of access, and of sufficient length to reach any part of the boiler room and spaces containing oil-fuel pumping units.

(e) All nautical school ships propelled by internal-combustion engines shall be equipped with the following foam type or carbon dioxide type fire extinguishers in the machinery spaces:

(1) One approved 12-gallon foam-type extinguisher or one approved 35-pound carbon dioxide type extinguisher.

(2) One approved 2½-gallon foam-type, or one approved 15-pound carbon dioxide type extinguisher for each 1,000 B. H. P. of the main engines, or frac-

tion thereof. The total number of fire extinguishers carried shall not be less than two and need not exceed six.

(3) When a donkey boiler fitted to burn oil as fuel is located in the machinery space, there shall be substituted for the 12-gallon foam type or 35-pound carbon dioxide type fire extinguisher required either one 40-gallon foam type or one 100-pound carbon dioxide type fire extinguisher.

(f) In this section any reference to an approved fire extinguisher means either approved by the Coast Guard or the Navy.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGD 76-086, 44 FR 2394, Jan. 11, 1979; CGD 95-027, 61 FR 26010, May 23, 1996]

§ 167.45-45 Carbon dioxide fire-extinguishing system requirements.

(a) When a carbon dioxide (CO₂) smothering system is fitted in the boiler room, the quantity of carbon dioxide carried shall be sufficient to give a gas saturation of 25 percent of the gross volume of the largest boiler room from tank top to top of the boilers. Top of the boilers is to be considered as the top of the shell of a Scotch or leg type of boiler, and the top of the casing or drum, whichever is the higher, on water-tube boilers. The quantity of carbon dioxide required may be determined approximately by the following formula:

$$W = \frac{L \times B \times D}{36} \quad (1)$$

where:

W=the weight of CO₂ required in pounds.

L=the length of the boiler room in feet.

B=the breadth of the boiler room in feet.

D=the distance in feet from tank top or flat forming lower boundary to top of boilers.

(b) When a carbon dioxide (CO₂) smothering system is fitted in the machinery space of a nautical school ship propelled by internal combustion engines, the quantity of carbon dioxide required may be determined approximately by the following formula:

$$W = \frac{L \times B \times D}{22} \quad (2)$$

where:

W=the weight of CO₂ required in pounds.

L=the length of machinery space in feet.

Coast Guard, DOT

§ 167.45-70

B=breadth of the machinery space in feet.
D=distance in feet from tank top or flat forming lower boundary to the underside of deck forming the hatch opening.

(c) The whole charge of gas shall be capable of being released simultaneously by operating one valve and control. All cylinders shall be completely discharged in not more than two minutes. The arrangement of the piping shall be such as to give a general and fairly uniform distribution over the entire area protected. An alarm which shall operate automatically with the operation of the system shall be provided to give a warning in the space when the carbon dioxide is about to be released. Provision shall be made to prevent the admission of air into the lower parts of the boiler or engine room while the system is in operation.

§ 167.45-50 Foam smothering system requirements.

(a) When a foam-type system is fitted, its capacity shall be such as to rapidly discharge over the entire area of the bilge (tank top) of the largest boiler room a volume of foam 6 inches deep in not more than 3 minutes. The arrangement of piping shall be such as to give a uniform distribution over the entire area protected.

(b) The foam-type system may be of a type approved by the Navy or Coast Guard. All containers and valves by which the system is operated shall be easily accessible and so placed that control valves and containers will not readily be cut off from use by an outbreak of fire.

§ 167.45-60 Emergency breathing apparatus and flame safety lamps.

Each nautical-school ship must be equipped with the following devices:

(a) Two pressure-demand, open circuit, self-contained breathing apparatus, approved by the Mine Safety and Health Administration (MSHA) and by the National Institute for Occupational Safety and Health (NIOSH) and having at a minimum a 30-minute air supply, a full face piece, and a spare charge for each. A self-contained compressed-air breathing apparatus previously approved under part 160, subpart 160.011, of this chapter may continue in use as

required equipment if it was part of the vessel's equipment on November 23, 1992, and as long as it is maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection.

(b) One flame safety lamp approved by the Coast Guard or Navy.

[CGD 86-036, 57 FR 48326, Oct. 23, 1992, as amended by CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 167.45-65 Portable fire extinguishers in accommodation spaces.

(a) All nautical school ships shall be provided with such number of good and efficient portable fire extinguishers approved by the Navy or Coast Guard as follows:

(1) Nautical school ships less than 150 feet in length shall have at least two fire extinguishers on each passenger deck.

(2) Nautical school ships 150 feet and over in length shall be provided with at least one fire extinguisher for every 150 linear feet of corridor length or fraction thereof in the spaces occupied by passengers and crew.

(3) In all public spaces fire extinguishers shall be located not more than 150 feet apart.

(b) The number of required fire extinguishers is based on the capacity of the ordinary fire extinguisher, which is about 2½ gallons, and no fire extinguisher of larger capacity shall be allowed a greater rating than that of the ordinary fire extinguisher. Fire extinguishers of approved types of less capacity are allowable when their total contents equal the required quantity.

§ 167.45-70 Portable fire extinguishers, general requirements.

(a) Extra charges shall be carried on board for 50 percent of each size and variety of fire extinguishers provided. If 50 percent of each size and variety of fire extinguishers carried gives a fractional result, extra charges shall be provided for the next largest whole number.

(1) The following is an example:

	Extra charges required
Fire extinguishers carried:	
1	1
2	1

	Extra charges required
3	2
4	2
5	3

(2) When the portable fire extinguisher is of such variety that it cannot be readily recharged by the vessel's personnel, one spare unit of the same classification shall be carried in lieu of spare charges for all such units of the same size and variety.

(b) Recharges, particularly the acid, used in charging soda-and-acid type of fire extinguishers, shall be packed in such manner that the filling operation (i.e., in recharging the extinguisher) can be performed without subjecting the person doing the recharging to undue risk of acid burns and shall be contained in Crown stopper type of bottle.

(c) [Reserved]

(d) Fire extinguishers shall be located in such places as in the judgment of the Officer in Charge, Marine Inspection, will be most convenient and serviceable in case of emergency and so arranged that they may be easily removed from their fastenings.

(e) Every fire extinguisher provided shall be examined at each annual inspection to determine that it is still in good condition. Soda-and-acid and foam fire extinguishers shall be tested by discharging the contents, cleaning thoroughly, and then refilling. Carbon dioxide fire extinguishers shall be checked by weighing to determine contents and if found to be more than 10 percent under required contents of carbon dioxide shall be recharged. Pump tank fire extinguishers shall be tested by pumping and discharging the contents, cleaning thoroughly, and then refilling or recharging. Cartridge-operated type fire extinguishers shall be checked by examining the extinguishing agents to determine if in still good condition and by examining the pressure cartridge. If the cartridge end is punctured, or if the cartridge is otherwise determined to have leaked or to be in an unsuitable condition, the pressure cartridge shall be rejected and a new one inserted. Stored pressure type extinguishers shall be checked by determining that the pressure gage is in the operating range, and the full

charge of extinguishing agent is in the chamber. The hoses and nozzles of all fire extinguishers shall be inspected to see that they are clear and in good condition.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 54-46, 19 FR 8708, Dec. 18, 1954; CGFR 59-21, 24 FR 7196; Sept. 5, 1959; CGFR 60-17, 25 FR 2667, Mar. 30, 1960; CGFR 62-17, 27 FR 9047, Sept. 11, 1962]

§ 167.45-75 Fire extinguishers for emergency powerplants.

In compartments where emergency lighting and wireless units are located, two fire extinguishers approved by the Coast Guard or the Navy, of either carbon dioxide or dry chemical type, shall be permanently located at the most accessible points. In addition, two fire extinguishers of the above types, or foam type, shall be permanently located so as to be readily accessible to the emergency fuel tanks containing gasoline, benzine or naphtha.

[CGFR 58-29, 23 FR 6882, Sept. 6, 1958, as amended by CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 167.45-80 Fire axes.

(a) All nautical school ships shall be provided with fire axes, as follows:

	Number of axes
Gross tons of nautical school ships:	
All not over 50 tons	1
All over 50 tons and not over 200 tons	2
All over 200 tons and not over 500 tons	4
All over 500 tons and not over 1,000 tons	6
All over 1,000 tons	8

(b) All fire axes shall be located so as to be readily found in time of need, shall not be used for general purposes, and shall be kept in good condition.

Subpart 167.50— Accommodations

§ 167.50-1 Hospital accommodations.

Each nautical school ship, which makes voyages of more than 3 days' duration between ports and carries 12 or more persons, shall be equipped with a compartment suitably separated from other spaces for hospital purposes, and such compartment shall have at least 1 bunk for every 12 persons allowed to be carried: *Provided*, That not more than 6 bunks shall be required in any case.

Subpart 167.55—Special Markings Required

§ 167.55-1 Draft marks and draft indicating systems.

(a) All vessels must have draft marks plainly and legibly visible upon the stem and upon the sternpost or rudderpost or at any place at the stern of the vessel as may be necessary for easy observance. The bottom of each mark must indicate the draft.

(b) The draft must be taken from the bottom of the keel to the surface of the water at the location of the marks.

(c) In cases where the keel does not extend forward or aft to the location of the draft marks, due to a raked stem or cut away skeg, the draft must be measured from a line projected from the bottom of the keel forward or aft, as the case may be, to the location of the draft marks.

(d) In cases where a vessel may have a skeg or other appendage extending locally below the line of the keel, the draft at the end of the vessel adjacent to such appendage must be measured to a line tangent to the lowest part of such appendage and parallel to the line of the bottom of the keel.

(e) Draft marks must be separated so that the projections of the marks onto a vertical plane are of uniform height equal to the vertical spacing between consecutive marks.

(f) Draft marks must be painted in contrasting color to the hull.

(g) In cases where draft marks are obscured due to operational constraints or by protrusions, the vessel must be fitted with a reliable draft indicating system from which the bow and stern drafts can be determined.

[CGD 89-037, 57 FR 41824, Sept. 11, 1992]

§ 167.55-5 Marking of fire and emergency equipment.

Marking of fire and emergency apparatus, watertight doors, lifeboat embarkation stations and direction signs, stateroom notices, instructions for changing steering gears, etc., shall be carried out as follows:

(a) *General alarm bell switch.* The general alarm bell switch in the pilot-house or fire control station shall be clearly marked with lettering on a

brass plate or with a sign in red letters on suitable background: "General Alarm."

(b) *General alarm bells.* General alarm bells shall be marked in not less than ½-inch red letters: "General Alarm—When Bell Rings Go to Your Station."

(c) *Steam, foam or CO₂ fire smothering apparatus.* Steam, foam or CO₂ fire smothering apparatus shall be marked "Steam Fire Apparatus" or "Foam Fire Apparatus" or "CO₂ Fire Apparatus", as appropriate, in not less than 2-inch red letters. The valves of all branch piping leading to the several compartments shall be distinctly marked to indicate the compartments or parts of the nautical school ship to which they lead.

(d) *Fire hose stations.* At each fire hose valve there shall be marked in not less than 2-inch red letters and figures "Fire Station 1," 2, 3, etc.

(e) *Emergency squad equipment.* Lockers or spaces containing equipment for use of the emergency squad shall be marked "Emergency Squad Equipment." Lockers or spaces where oxygen or fresh air breathing apparatus is stowed shall be marked "Oxygen Breathing Apparatus" or "Fresh Air Breathing Apparatus," as appropriate.

(f) *Fire extinguishers.* Each fire extinguisher shall be marked with a number and the location where stowed shall be marked in corresponding numbers in not less than 1-inch figures.

(g) *Watertight doors.* Each watertight door shall be numbered in at least 2-inch letters and figures "W.T.D. 1," 2, 3, etc. The color of the marking shall be in contrast to the background. All watertight door remote hand-closing stations shall be marked in at least 2-inch letters and figures "W. T. D. 1," 2, 3, etc. The direction of operation of the lever or wheel provided to close or open the door at all watertight door remote hand-closing stations shall be marked. The color of the sign shall contrast with the background.

(h) *Instructions for changing steering gear.* Instructions in at least ½-inch letters and figures shall be posted at each emergency steering station and in the steering engine room, relating in order, the different steps to be taken in changing to the emergency steering gear. Each clutch, gear wheel, level,

valve, or switch which is used during the changeover shall be numbered or lettered on a brass plate or painted so that the markings can be recognized at a reasonable distance. The instructions shall indicate each clutch or pin to be "in" or "out" and each valve or switch which is to be "opened" or "closed" in shifting to any means of steering for which the vessel is equipped. Instructions shall be included to line up all steering wheels and rudder amidship before changing gears.

(i) *Rudder orders.* At all steering stations, there shall be installed a suitable notice on the wheel or device or at such other position as to be directly in the helmsman's line of vision, to indicate the direction in which the wheel or device must be turned for "right rudder" and for "left rudder."

(j) *Lifesaving appliances.* Each lifesaving appliance must be marked as required under subchapter W (Lifesaving Appliances and Arrangements) of this chapter.

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 54-46, 19 FR 8708, Dec. 18, 1954; CGFR 60-36, 25 FR 10642, Nov. 5, 1960; CGD 73-24R, 39 FR 10139, Mar. 18, 1974; CGD 75-040, 40 FR 58454, Dec. 17, 1975; CGD 84-069, 61 FR 25311, May 20, 1996]

Subpart 167.60—Certificates of Inspection

§ 167.60-1 Issuance by Officer in Charge, Marine Inspection.

(a) Every nautical school ship shall be inspected annually and if in the opinion of the Officer in Charge, Marine Inspection, the nautical school ship can be operated safely, he shall issue a certificate of inspection with the following indorsement: "Nautical School Ship" in lieu of the classification "Passenger vessel", "cargo vessel", etc.

(b) When a nautical school ship, in the opinion of the Officer in Charge, Marine Inspection, may be navigated on the waters of any ocean or the Gulf of Mexico more than 20 nautical miles offshore, the route shall be designated on certificate of inspection as "Ocean".

(c) When a nautical school ship, in the opinion of the Officer in Charge, Marine Inspection, may be navigated on the waters of any ocean or the Gulf

of Mexico 20 nautical miles or less offshore, the route shall be designated on the certificate of inspection as "Coastwise".

(d) Documented vessels of 500 gross tons or more, certificated for ocean or coastwise service, which do not comply with the requirements of SOLAS 74 for cargo vessels shall have their certificate of inspection endorsed "Domestic Voyages Only."

[CGFR 51-11, 16 FR 3218, Apr. 12, 1951, as amended by CGFR 69-127, 35 FR 9982, June 17, 1970; CGD 90-008, 55 FR 30663, July 26, 1990]

§ 167.60-5 Period of time for which valid.

A certificate of inspection for any period less than one year shall not be issued, but nothing herein shall be construed as preventing the revocation or suspension of a certificate of inspection in case such process is authorized by law.

§ 167.60-10 Exhibition of certificate of inspection.

On every nautical school ship, the original certificate of inspection shall be framed under glass and posted in a conspicuous place.

§ 167.60-15 Manning and persons allowed to be carried.

The Officer in Charge, Marine Inspection, shall specify in the Certificate of Inspection the minimum complement of officers and crew necessary for the safe navigation of the vessel and shall specify the total number of persons allowed to be carried.

[CGD 74-201, 41 FR 19647, May 13, 1976]

Subpart 167.65—Special Operating Requirements

§ 167.65-1 Emergency training, musters, and drills.

Onboard training, musters, and drills must be in accordance with subchapter W (Lifesaving Appliances and Arrangements) of this chapter.

[CGD 84-069, 61 FR 25311, May 20, 1996]

§ 167.65-5 Flashing the rays of a searchlight or other blinding light.

Flashing the rays of a searchlight or other blinding light onto the bridge or

into the pilothouse of any vessel under way is prohibited.

§ 167.65-15 Routing instructions; strict compliance with.

All licensed masters, officers, and certificated seamen on nautical school ships must strictly comply with routing instructions issued by competent naval authority.

[CGD 95-027, 61 FR 26010, May 23, 1996]

§ 167.65-20 Unnecessary whistling.

Unnecessary sounding of a nautical school ship's whistle is prohibited within any harbor limits of the United States.

§ 167.65-25 Steering gear tests.

On all nautical school ships making voyages of more than 48 hours' duration, the entire steering gear, the whistle, the means of communication and the signaling appliances between the bridge or pilothouse and engine room shall be examined and tested by an officer of the nautical school ship within a period of not more than 12 hours before leaving port. All nautical school ships making voyages of less than 48 hours' duration shall be so examined and tested at least once in every week. The fact and time of such examination and test shall be recorded in the log book.

§ 167.65-35 Use of auto pilot.

Except as provided in 33 CFR 164.15, when the automatic pilot is used in—

- (a) Areas of high traffic density;
- (b) Conditions of restricted visibility; and
- (c) All other hazardous navigational situations, the master shall ensure that—

(1) It is possible to immediately establish human control of the ship's steering;

(2) A competent person is ready at all times to take over steering control; and

(3) The changeover from automatic to manual steering and vice versa is made by, or under, the supervision of the officer of the watch.

[CFR 75-074, 42 FR 5964, Jan. 17, 1977]

§ 167.65-38 Loading doors.

(a) The master of a vessel fitted with loading doors shall assure that all loading doors are closed watertight and secured during the entire voyage except that—

(1) If a door cannot be opened or closed while the vessel is at a dock, it may be open while the vessel approaches and draws away from the dock, but only as far as necessary to enable the door to be immediately operated.

(2) If needed to operate the vessel, or embark and disembark passengers when the vessel is at anchor in protected waters, loading doors may be open provided that the master determines that the safety of the vessel is not impaired.

(b) For the purposes of this section, "loading doors" include all weather-tight ramps, bow visors, and openings used to load personnel, equipment, and stores, in the collision bulkhead, the side shell, and the boundaries of enclosed superstructures that are continuous with the shell of the vessel.

(c) The master shall enter into the log book the time and door location of every closing of the loading doors.

(d) The master shall enter into the log book any opening of the doors in accordance with paragraph (a)(2) of this section setting forth the time of the opening of the doors and the circumstances warranting this action.

[CGD 89-037, 57 FR 41824, Sept. 11, 1992]

§ 167.65-40 Draft.

The master of every nautical school ship over 50 gross tons shall, whenever leaving port, enter the maximum draft of his nautical school ship in the log book.

§ 167.65-42 Verification of vessel compliance with applicable stability requirements.

(a) After loading and prior to departure and at all other times necessary to assure the safety of the vessel, the master shall determine that the vessel complies with all applicable stability requirements in the vessel's trim and stability book, stability letter, Certificate of Inspection, and Load Line Certificate, as the case may be, and then

enter an attestation statement of the verification in the log book. The vessel may not depart until it is in compliance with these requirements.

(b) When determining compliance with applicable stability requirements the vessel's draft, trim, and stability must be determined as necessary and any stability calculations made in support of the determination must be retained on board the vessel for the duration of the voyage.

[CGD 89-037, 57 FR 41824, Sept. 11, 1992]

§ 167.65-45 Notice to mariners; aids to navigation.

(a) Officers are required to acquaint themselves with the latest information published by the Coast Guard and the U.S. Navy regarding aids to navigation, and neglect to do so is evidence of neglect of duty. It is desirable that nautical school ships navigating oceans and coastwise and Great Lakes waters shall have available in the pilothouse for convenient reference at all times a file of the applicable Notice to Mariners.

(b) Weekly Notices to Mariners (Great Lakes Edition), published by the Commander, 9th Coast Guard District, contain announcements and information on changes in aids to navigation and other marine information affecting the safety of navigation on the Great Lakes. These notices may be obtained free of charge, by making application to Commander, 9th Coast Guard District.

(c) Weekly Notices to Mariners (Worldwide coverage) are prepared jointly by the U.S. Naval Oceanographic Office, the U.S. Coast and Geodetic Survey and the U.S. Coast Guard. They include changes in aids to navigation in assembled form for the 1st, 5th, 7th, Greater Antilles Section, 8th, 11th, 13th, 14th, and 17th Coast Guard Districts. Foreign marine information is also included in these notices. These notices are available without charge from the U.S. Naval Oceanographic Office, Washington, DC 20390, Branch Oceanographic Offices, U.S. Collector of Customs of the major seaports in the United States and are also on file in the U.S. Consulates where they may be inspected.

(d) As appropriate for the intended voyage, all nautical school ships must carry adequate and up-to-date—

- (1) Charts;
- (2) Sailing directions;
- (3) Coast pilots;
- (4) Light lists;
- (5) Notices to mariners;
- (6) Tide tables;
- (7) Current tables; and
- (8) All other nautical publications necessary.¹

[CGFR 66-33, 31 FR 15298, Dec. 6, 1966, as amended by CGFR 75-074, 42 FR 5964, Jan. 31, 1977; CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 167.65-50 Posting placards of lifesaving signals.

On all vessels to which this subpart applies there must be readily available to the deck officer of the watch a placard containing instructions for the use of the life saving signals set forth in regulation 16, chapter V, of the International Convention for Safety of Life at Sea, 1974. These signals must be used by vessels or persons in distress when communicating with lifesaving stations and maritime rescue units.

[CGD 95-027, 61 FR 26010, May 23, 1996]

§ 167.65-60 Examination of boilers and machinery by engineer.

It shall be the duty of an engineer when he assumes charge of the boilers and machinery of a nautical school ship to examine the same forthwith and thoroughly, and if he finds any part thereof in bad condition, he shall immediately report the facts to the master, owner, or agent, and to the Officer in Charge, Marine Inspection, of the district, who shall thereupon investigate the matter and take such actions as may be necessary.

§ 167.65-65 Notice and reporting of casualty and voyage records.

The requirements for providing notice and reporting of marine casualties and for retaining voyage records are contained in part 4 of this chapter.

[CGD 84-099, 52 FR 47536, Dec. 14, 1987]

¹For United States vessels in one or on the navigable waters of the United States, see 33 CFR 164.33.

§ 167.65-70 Reports of accidents, repairs, and unsafe boilers and machinery by engineers.

(a) Before making repairs to a boiler of a nautical school ship the engineer in charge shall report, in writing, the nature of such repairs to the nearest Officer in Charge, Marine Inspection, where such repairs are to be made.

(b) And it shall be the duty of all engineers when an accident occurs to the boilers or machinery in their charge tending to render the further use of such boilers or machinery unsafe until repairs are made, or when, by reason of ordinary wear, such boilers or machinery have become unsafe, to report the same to the Officer in Charge, Marine Inspection, immediately upon the arrival of the nautical school ship at the first port reached subsequent to the accident, or after the discovery of such unsafe condition by said engineer.

PART 168—CIVILIAN NAUTICAL SCHOOL VESSELS

Subpart 168.01—Authority and Purpose

Sec.

168.01-1 Purpose of regulations.

Subpart 168.05—General Requirements

168.05-1 Application of passenger vessel inspection laws.

168.05-5 Application of passenger vessel inspection regulations.

168.05-10 Subdivision and stability.

168.05-15 Right of appeal.

Subpart 168.10—Definitions of Terms Used in This Part

168.10-1 Nautical school vessels.

168.10-5 Civilian nautical school.

Subpart 168.15—Accommodations

168.15-1 Intent.

168.15-5 Location of crew spaces.

168.15-10 Construction.

168.15-15 Size.

168.15-20 Equipment.

168.15-25 Washrooms.

168.15-30 Toilet rooms.

168.15-35 Hospital space.

168.15-40 Lighting.

168.15-45 Heating and cooling.

168.15-50 Ventilation.

168.15-55 Screening.

168.15-60 Inspection.

AUTHORITY: 46 U.S.C. 3305, 3306; 49 CFR 1.46.

SOURCE: CGFR 52-43, 17 FR 9543, Oct. 18, 1952, unless otherwise noted.

Subpart 168.01—Authority and Purpose

§ 168.01-1 Purpose of regulations.

(a) The purpose of the regulations in this part is to set forth uniform minimum requirements for vessels, whether being navigated or not, which are used by or in connection with any civilian nautical school, except vessels of the Navy or Coast Guard.

Subpart 168.05—General Requirements

§ 168.05-1 Application of passenger vessel inspection laws.

(a) All laws covering the inspection of passenger vessels are hereby made applicable to all vessels or other floating equipment used by or in connection with any civilian nautical school, whether such vessels or other floating equipment are being navigated or not, except vessels of the Navy or Coast Guard.

§ 168.05-5 Application of passenger vessel inspection regulations.

Where the requirements are not covered specifically in this part, all the regulations applying to passenger vessels in subchapters E (Load Lines), F (Marine Engineering), H (Passenger Vessels), J (Electrical Engineering), K (Small Passenger Vessels Carrying More Than 150 Passengers Or With Overnight Accommodations For More Than 49 Passengers), P (Manning), Q (Specifications), T (Small Passenger Vessels), and W (Lifesaving Appliances and Arrangements) of this chapter are hereby made applicable to all vessels or other floating equipment used by or in connection with any civilian nautical school, whether such vessels or other floating equipment are being navigated or not, except vessels of the Navy or Coast Guard.

[CGD 84-069, 61 FR 25312, May 20, 1996, as amended at 63 FR 52816, Oct. 1, 1998]

EFFECTIVE DATE NOTES: At 63 FR 52816, Oct. 1, 1998, § 168.05-5 was amended by removing the word "Accomadations" and adding in

§ 168.05–10

its place the word “Accommodations”, effective Nov. 2, 1998.

§ 168.05–10 Subdivision and stability.

Each vessel must meet the applicable requirements in Subchapter S of this chapter.

[CGD 79–023, 48 FR 51010, Nov. 4, 1983]

§ 168.05–15 Right of appeal.

Any person directly affected by a decision or action taken under this part, by or on behalf of the Coast Guard, may appeal therefrom in accordance with subpart 1.03 of this chapter.

[CGD 88–033, 54 FR 50381, Dec. 6, 1989]

Subpart 168.10—Definitions of Terms Used in This Part

§ 168.10–1 Nautical school vessels.

The term *nautical school vessel* means a vessel operated by or in connection with a nautical school or an educational institution under Section 13 of the Coast Guard Authorization Act of 1986.

[CGD 84–069, 61 FR 25312, May 20, 1996]

§ 168.10–5 Civilian nautical school.

The term *civilian nautical school* means any school or branch thereof operated and conducted in the United States, except State nautical schools and schools operated by the United States or any agency thereof, which offers instruction for the primary purpose of training for service in the merchant marine.

[CGD 84–069, 61 FR 25312, May 20, 1996]

Subpart 168.15—Accommodations

SOURCE: CGD 95–027, 61 FR 26010, May 23, 1996, unless otherwise noted.

§ 168.15–1 Intent.

The accommodations provided for members of the crew, passengers, cadets, students, instructors or any other persons at any time quartered on board a vessel to which this part applies must be securely constructed, properly lighted, heated, drained, ventilated,

46 CFR Ch. I (10–1–98 Edition)

equipped, located, arranged and insulated from undue noise, heat and odors.

§ 168.15–5 Location of crew spaces.

(a) Quarters must be located so that sufficient fresh air and light are obtainable compatible with accepted practice or good arrangement and construction.

(b) Unless approved by the Commandant, quarters, must not be located forward of the collision bulkhead, nor may such section or sections of any deck head occupied by quarters be below the deepest load line.

§ 168.15–10 Construction.

(a) The accommodations provided must be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, arranged, and insulated from undue noise, heat, and odors.

(b) All accommodations must be constructed and arranged so that they can be kept in a clean, workable, and sanitary condition.

§ 168.15–15 Size.

(a) Sleeping accommodations must be divided into rooms, no one of which may berth more than six persons. The purpose for which each space is to be used and the number of persons it may accommodate, must be marked outside the space.

(b) Each room must be of such size that there is at least 1.8 square meters (20 square feet) of deck area and a volume of at least 4.2 cubic meters (150 cubic feet) for each person accommodated. In measuring sleeping quarters, any furnishings contained therein are not to be deducted from the total volume or from the deck area.

[CGD 95–027, 61 FR 26010, May 23, 1996; 61 FR 35138, July 5, 1996]

§ 168.15–20 Equipment.

(a) Each person shall have a separate berth and not more than 1 berth may be placed above another. The berths must be of metal framework. The overall size of a berth must not be less than 68 centimeters (27 inches) wide by 190 centimeters (75 inches) long. Where 2 tiers of berths are fitted, the bottom of the lower berth must not be less than

30 centimeters (12 inches) above the deck, and the bottom of the upper must not be less than 76 centimeters (30 inches) from both the bottom of the lower and from the deck overhead. The berths must not be obstructed by pipes, ventilating ducts, or other installations.

(b) A metal locker must be provided for each person accommodated in a room.

§ 168.15-25 Washrooms.

(a) There must be provided 1 shower for each 10 persons or fraction thereof and 1 wash basin for each 6 persons or fraction thereof for all persons who do not occupy rooms to which private or semi-private facilities are attached.

(b) All wash basins and showers must be equipped with adequate plumbing, including hot and cold running fresh water.

[CGD 95-027, 61 FR 26010, May 23, 1996; 61 FR 35138, July 5, 1996]

§ 168.15-30 Toilet rooms.

(a) There must be provided 1 toilet for each 10 persons or fraction thereof to be accommodated who do not occupy rooms to which private facilities are attached.

(b) The toilet rooms must be located convenient to the sleeping quarters of the persons to which they are allotted but must not open directly into such quarters except when they are provided as private or semiprivate facilities.

(c) Where more than 1 toilet is located in a space or compartment, each toilet must be separated by partitions.

§ 168.15-35 Hospital space.

(a) Each vessel must be provided with a hospital space. This space must be situated with due regard for the comfort of the sick so that they may receive proper attention in all weather.

(b) The hospital must be suitably separated from other spaces and must be used for the care of the sick and for no other purpose.

(c) The hospital must be fitted with berths in the ratio of 1 berth to every 12 persons, but the number of berths need not exceed 6.

(d) [Reserved]

(e) The hospital must have a toilet, wash basin, and bathtub or shower con-

veniently located. Other necessary suitable equipment of a sanitary type such as a clothes locker, a table and a seat must be provided.

§ 168.15-40 Lighting.

All quarters, including washrooms, toilet rooms, and hospital spaces, must be adequately lighted.

§ 168.15-45 Heating and cooling.

All quarters must be adequately heated and cooled in a manner suitable to the purpose of the space.

§ 168.15-50 Ventilation.

(a) All quarters must be adequately ventilated in a manner suitable to the purpose of the space and route of the vessel.

(b) When mechanical ventilation is provided for sleeping rooms, washrooms, toilet rooms, hospital spaces, and messrooms, these spaces must be supplied with fresh air equal to at least 10 times the volume of the room each hour.

§ 168.15-55 Screening.

Provision must be made to protect the quarters against the admission of insects.

§ 168.15-60 Inspection.

The Officer in Charge, Marine Inspection, shall inspect the quarters of every such vessel at least once in each month or at such time as the vessel enters an American port and shall satisfy himself that such vessel is in compliance with the regulations in this part.

PART 169—SAILING SCHOOL VESSELS

Subpart 169.100—General Provisions

Sec.

- 169.101 Purpose.
- 169.103 Applicability.
- 169.107 Definitions.
- 169.109 Equivalents.
- 169.111 Administrative procedures.
- 169.112 Special consideration.
- 169.113 Right of appeal.
- 169.115 Incorporation by reference.
- 169.117 OMB control numbers.
- 169.119 Vessel status.
- 169.121 Loadlines.

Pt. 169

46 CFR Ch. I (10–1–98 Edition)

Subpart 169.200—Inspection and Certification

CERTIFICATE OF INSPECTION

- 169.201 When required.
- 169.203 Description.
- 169.205 How to obtain or renew.
- 169.207 Period of validity.
- 169.209 Routes permitted.
- 169.211 Permit to proceed for repair.
- 169.213 Permit to carry excursion party.
- 169.215 Certificate of inspection amendment.
- 169.217 Posting.

LETTER OF DESIGNATION

- 169.218 Procedures for designating sailing school vessels.
- 169.219 Renewal of letter of designation.

INSPECTION FOR CERTIFICATION

- 169.220 General.
- 169.221 Initial inspection for certification.
- 169.222 Scope of inspection for certification.
- 169.223 Subsequent inspections for certification.

REINSPECTION

- 169.225 When required.
- 169.227 Scope.

DRYDOCKING OR HAULING OUT

- 169.229 Drydock examination and internal structural examination intervals.
- 169.231 Definitions relating to hull examinations.
- 169.233 Notice and plans required.
- 169.234 Integral fuel oil tank examinations.

REPAIRS AND ALTERATIONS

- 169.235 Permission required.
- 169.236 Inspection and testing required.

INSPECTIONS

- 169.237 Inspection standards.
- 169.239 Hull.
- 169.241 Machinery.
- 169.243 Electrical.
- 169.245 Lifesaving equipment.
- 169.247 Firefighting equipment.
- 169.249 Pressure vessels.
- 169.251 Steering apparatus.
- 169.253 Miscellaneous systems and equipment.
- 169.255 Sanitary inspection.
- 169.257 Unsafe practices.
- 169.259 Limitations of inspections.

Subpart 169.300—Construction and Arrangement

PLANS

- 169.305 Plans required.
- 169.307 Plans for sister vessels.

HULL STRUCTURE

- 169.309 Structural standards.
- 169.311 Fire protection.
- 169.313 Means of escape.
- 169.315 Ventilation (other than machinery spaces).

LIVING SPACES

- 169.317 Accommodations.
- 169.319 Washrooms and toilets.
- 169.323 Furniture and furnishings.

RAILS AND GUARDS

- 169.327 Deck rails.
- 169.329 Storm rails.
- 169.331 Guards in hazardous locations.

Subpart 169.400—Watertight Integrity, Subdivision, and Stability

- 169.401 Applicability.

Subpart 169.500—Lifesaving and Firefighting Equipment

LIFESAVING EQUIPMENT—GENERAL

- 169.505 Equipment installed but not required.
- 169.507 Responsibility of master.
- 169.509 Approval for repairs and alterations.

PRIMARY LIFESAVING EQUIPMENT

- 169.513 Types of primary equipment.
- 169.515 Number required.
- 169.517 Rescue boat.
- 169.519 Availability.
- 169.521 Stowage.

EQUIPMENT FOR PRIMARY LIFESAVING APPARATUS

- 169.525 General.
- 169.527 Required equipment for lifeboats.
- 169.529 Description of lifeboat equipment.
- 169.531 Required equipment for liferafts.
- 169.535 Required equipment for lifefloats.
- 169.537 Description of equipment for lifefloats.

PERSONAL FLOTATION DEVICES

- 169.539 Type required.
- 169.541 Number required.
- 169.543 Distribution and stowage.
- 169.545 Markings.

ADDITIONAL LIFESAVING EQUIPMENT

- 169.549 Ring lifebuoys and water lights.
- 169.551 Exposure suits.
- 169.553 Pyrotechnic distress signals.
- 169.555 Emergency position indicating radio beacon (EPIRB).
- 169.556 Work vests.

FIREFIGHTING EQUIPMENT

- 169.559 Fire pumps.

Coast Guard, DOT

Pt. 169

- 169.561 Firemain.
- 169.563 Firehose.
- 169.564 Fixed extinguishing system, general.
- 169.565 Fixed carbon dioxide system.
- 169.567 Portable extinguishers.
- 169.569 Fire axes.

Subpart 169.600—Machinery and Electrical

- 169.601 General.

INTERNAL COMBUSTION ENGINE INSTALLATIONS

- 169.605 General.
- 169.607 Keel cooler installations.
- 169.608 Grid cooler installations.
- 169.609 Exhaust systems.
- 169.611 Carburetors.

FUEL SYSTEMS

- 169.613 Gasoline fuel systems.
- 169.615 Diesel fuel systems.

STEERING SYSTEMS

- 169.618 General.
- 169.619 Reliability.
- 169.621 Communications.
- 169.622 Rudder angle indicators.
- 169.623 Power-driven steering systems.

VENTILATION

- 169.625 Compartments containing diesel machinery.
- 169.627 Compartments containing diesel fuel tanks.
- 169.629 Compartments containing gasoline machinery or fuel tanks.
- 169.631 Separation of machinery and fuel tank spaces from accommodation spaces.

PIPING SYSTEMS

- 169.640 General.
- 169.642 Vital systems.

BILGE SYSTEMS

- 169.650 General.
- 169.652 Bilge piping.
- 169.654 Bilge pumps.

ELECTRICAL

- 169.662 Hazardous locations.

ELECTRICAL INSTALLATIONS OPERATING AT POTENTIALS OF LESS THAN 50 VOLTS ON VESSELS OF LESS THAN 100 GROSS TONS

- 169.664 Applicability.
- 169.665 Name plates.
- 169.666 Generators and motors.
- 169.667 Switchboards.
- 169.668 Batteries.
- 169.669 Radiotelephone equipment.
- 169.670 Circuit breakers.
- 169.671 Accessories.
- 169.672 Wiring for power and lighting circuits.

- 169.673 Installation of wiring for power and lighting circuits.

ELECTRICAL INSTALLATIONS OPERATING AT POTENTIALS OF 50 VOLTS OR MORE ON VESSELS OF LESS THAN 100 GROSS TONS

- 169.674 Applicability.
- 169.675 Generators and motors.
- 169.676 Grounded electrical systems.
- 169.677 Equipment protection and enclosure.
- 169.678 Main distribution panels and switchboards.
- 169.679 Wiring for power and lighting circuits.
- 169.680 Installation of wiring for power and lighting circuits.
- 169.681 Disconnect switches and devices.
- 169.682 Distribution and circuit loads.
- 169.683 Overcurrent protection, general.
- 169.684 Overcurrent protection for motors and motor branch circuits.
- 169.685 Electric heating and cooking equipment.
- 169.686 Shore power.

ELECTRICAL INSTALLATIONS ON VESSELS OF 100 GROSS TONS AND OVER

- 169.687 General.
- 169.688 Power supply.
- 169.689 Demand loads.
- 169.690 Lighting branch circuits.
- 169.691 Navigation lights.
- 169.692 Remote stop stations.
- 169.693 Engine order telegraph systems.

Subpart 169.700—Vessel Control, Miscellaneous Systems, and Equipment

- 169.703 Cooking and heating.
- 169.705 Mooring equipment.
- 169.709 Compass.
- 169.711 Emergency lighting.
- 169.713 Engine room communication system.
- 169.715 Radio.
- 169.717 Fireman's outfit.
- 169.721 Storm sails and halyards (exposed and partially protected waters only).
- 169.723 Safety belts.
- 169.725 First aid kit.
- 169.726 Radar reflector.

MARKINGS

- 169.730 General alarm bell switch.
- 169.731 General alarm bells.
- 169.732 Carbon dioxide alarm.
- 169.733 Fire extinguishing branch lines.
- 169.734 Fire extinguishing system controls.
- 169.735 Fire hose stations.
- 169.736 Self-contained breathing apparatus.
- 169.737 Hand portable fire extinguishers.
- 169.738 Emergency lights.
- 169.739 Lifeboats.
- 169.740 Life rafts and life floats.
- 169.741 Personal flotation devices and ring life buoys.
- 169.743 Portable magazine chests.

§ 169.101

- 169.744 Emergency position indicating radio beacon (EPIRB).
- 169.745 Escape hatches and emergency exits.
- 169.746 Fuel shutoff valves.
- 169.747 Watertight doors and hatches.
- 169.750 Radio call sign.
- 169.755 Draft marks and draft indicating systems.

Subpart 169.800—Operations

- 169.805 Exhibition of licenses.
- 169.807 Notice of casualty.
- 169.809 Charts and nautical publications.
- 169.813 Station bills.
- 169.815 Emergency signals.
- 169.817 Master to instruct ship's company.
- 169.819 Manning of lifeboats and liferafts.
- 169.821 Patrol person.
- 169.823 Openings.
- 169.824 Compliance with provisions of certificate of inspection.
- 169.825 Wearing of safety belts.

TESTS, DRILLS, AND INSPECTIONS

- 169.826 Steering, communications and control.
- 169.827 Hatches and other openings.
- 169.829 Emergency lighting and power systems.
- 169.831 Emergency position indicating radio beacon (EPIRB).
- 169.833 Fire and boat drills.
- 169.837 Lifeboats, liferafts, and lifefloats.
- 169.839 Firefighting equipment.
- 169.840 Verification of vessel compliance with applicable stability requirements.
- 169.841 Logbook entries.
- 169.847 Lookouts.
- 169.849 Posting placards containing instructions for launching and inflating inflatable liferafts.
- 169.853 Display of plans.
- 169.855 Pre-underway training.
- 169.857 Disclosure of safety standards.

AUTHORITY: 33 U.S.C. 1321(j); 46 U.S.C. 3306, 6101; E.O. 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp., p. 793; 49 CFR 1.45, 1.46; §169.117 also issued under the authority of 44 U.S.C. 3507.

SOURCE: CGD 83-005, 51 FR 896, Jan. 9, 1986, unless otherwise noted.

Subpart 169.100—General Provisions

§ 169.101 Purpose.

The regulations in this part set forth uniform requirements which are suited to the particular characteristics and specialized operations of sailing school vessels as defined in Title 46, United States Code section 2101(30).

46 CFR Ch. I (10–1–98 Edition)

§ 169.103 Applicability.

(a) This subchapter applies to each foreign and domestic vessel operating as a sailing school vessel except as follows:

(1) A vessel of a foreign nation signatory to the International Convention for the Safety of Life at Sea and which has on board a current valid Safety Certificate; or

(2) A vessel of a foreign nation having inspection laws approximating those of the United States together with reciprocal arrangements with the United States and which has on board a current valid certificate of inspection issued by its government.

(b) This subchapter does not apply to—

(1) Any vessel operating exclusively on inland waters which are not navigable waters of the United States;

(2) Any vessel while laid up, dismantled, and out of service;

(3) Any vessel with title vested in the United States and which is used for public purposes except vessels of the U.S. Maritime Administration;

(4) Any vessel carrying one or more passengers; or

(5) Any vessel operating under the authority of a current valid certificate of inspection issued in accordance with the requirements of Subchapter H or T, 46 CFR parts 70 through 78 and parts 175 through 187, respectively.

(c) A vessel which engages in trade or commerce or carries one or more passengers, cannot operate under a certificate of inspection as a sailing school vessel, but must meet the rules and regulations governing the service in which it is engaged.

§ 169.107 Definitions.

(a) *Approved* means accepted by the Commandant unless otherwise stated.

(b) *Coast Guard District Commander* means an officer of the Coast Guard designated by the Commandant to command all Coast Guard activities within a district.

(c) *Commandant* means the Commandant of the Coast Guard or an authorized representative of the Commandant.

(d) *Existing vessel* means a sailing school vessel, whose keel was laid prior to (January 9, 1986), which applies for

certification as a sailing school vessel prior to (January 9, 1987), and whose initial inspection for certification is completed prior to (January 9, 1988).

(e) *Exposed Waters* means waters more than 37 kilometers (20 nautical miles) from the mouth of a harbor of safe refuge, or other waters the Officer in Charge, Marine Inspection determines to present special hazards due to weather or other circumstances.

(f) *Guest* means an individual on board a sailing school vessel who is not a member of the ship's company and has not contributed any consideration, either directly or indirectly, for carriage on the vessel. Guests are not considered passengers for the purpose of these regulations.

(g) *Headquarters* means the Office of the Commandant, United States Coast Guard, Washington, DC 20593.

(h) *Instructor* means any person who is aboard a sailing school vessel for the purpose of providing sailing instruction and is not an officer, operator, or member of the crew required by regulation to be aboard the vessel, and has not paid any consideration, either directly or indirectly for his or her carriage on the vessel.

(i) *Length* means the mean length. It is the mean or average between length on deck (LOD) and length between perpendiculars (LBP). *Length on deck* (LOD) means the length between the forward-most and after-most points on the weather deck, excluding sheer. *Length between perpendiculars* (LBP) means the horizontal distance between the perpendiculars taken at the forward-most and after-most points on a vessel's waterline corresponding to the deepest operating draft.

(j) *Marine Inspector* means any person from the civilian or military branch of the Coast Guard assigned by the Officer in Charge, Marine Inspection or any other person designated by the Coast Guard to perform duties with respect to the inspection, enforcement, and administration of vessel safety and navigation laws and regulations.

(k) *Master* means the senior licensed individual having command of the vessel.

(l) *New vessel* means a sailing school vessel which is not an existing vessel.

(m) *Officer In Charge, Marine Inspection (OCMI)* means any person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who, under the direction of the Coast Guard District Commander, is in charge of the inspection zone in which the vessel is located for the performance of duties with respect to the inspections, enforcement, and administration of vessel safety and navigation laws and regulations.

(n) *Partially Protected Waters* means—

(1) Waters within 37 kilometers (20 nautical miles) of a harbor of safe refuge, unless determined by the OCMI to be exposed waters; and

(2) Those portions of rivers, harbors, lakes, etc. which the OCMI determines not to be sheltered.

(o) *Passenger* means any person carried on board a vessel other than—

(1) The owner or his representative;

(2) The master and bona fide members of the crew who are engaged in the business of the vessel and paid for their services;

(3) Any employee of the owner of the vessel engaged in the business of the owner, except when the vessel is operating under a bareboat charter;

(4) Any employee of the bareboat charterer of the vessel engaged in the business of the bareboat charterer;

(5) Any guest; or

(6) Any sailing school instructor or sailing school student.

(p) *Protected Waters* means sheltered waters presenting no special hazards such as most rivers, harbors, lakes, etc.

(q) *Qualified Organization* means an educational organization, State, or political subdivision of a State that owns or demise charters, and operates a sailing school vessel for the purpose of providing sailing instruction. The educational organization must satisfy the requirements of section 501(c)(3) of the Internal Revenue Code of 1954 and must be exempt from tax under section 501(a) of such Code, as now or hereafter amended.

(r) *Recognized Classification Society* means the American Bureau of Shipping or other classification society recognized by the Commandant.

(s) *Rules of the Road* means the statutory and regulatory rules governing navigation of vessels.

(t) *Sailing Instruction* means teaching, research, and practical experience in operating vessels propelled primarily by sail, and may include—

(1) Any subject related to that operation and the sea, including seamanship, navigation, oceanography, other nautical and marine sciences, and maritime history and literature; and

(2) When in conjunction with a subject referred to in paragraph (t)(1) of this paragraph, instruction in mathematics and language arts skills to sailing school student having learning disabilities.

(u) *Sailing School Student* means any person who is aboard a sailing school vessel for the purpose of receiving sailing instruction.

(v) *Sailing School Vessel* means a vessel of less than 500 gross tons, carrying six or more individuals who are sailing school students or sailing school instructors, principally equipped for propulsion by sail even if the vessel has an auxiliary means of propulsion, and owned or demise chartered and operated by a qualified organization during such times as the vessel is operated exclusively for the purposes of sailing instruction.

(w) *Ship's Company* means the officers and crew of a sailing school vessel, sailing school students, and sailing school instructors.

(x) *Watertight* means designed and constructed to withstand a static head of water without any leakage, except that *watertight equipment* means enclosed equipment constructed so that a stream of water from a hose (not less than 1 inch in diameter) under head of about 35 feet from a distance of about 10 feet, and for a period of 5 minutes, can be played on the apparatus without leakage.

(y) *Weathertight* means that water will not penetrate into the unit in any sea condition, except that *weathertight equipment* means equipment constructed or protected so that exposure to a beating rain will not result in the entrance of water.

[CGD 83-005, 51 FR 897, Jan. 9, 1986; 51 FR 3785, Jan. 30, 1986]

§ 169.109 Equivalents.

Substitutes for a fitting, appliance, apparatus, or equipment, may be ac-

cepted by the Commandant if the substituted item is as effective and consistent with the requirements and minimum safety standards specified in this subchapter.

§ 169.111 Administrative procedures.

(a) Upon receipt of a written application for inspection, the Officer in Charge, Marine Inspection assigns a marine inspector to inspect the vessel at a mutually agreed upon time and place.

(b) The owner or a representative shall be present during the inspection.

(c) If during the inspection, the vessel or its equipment is found not to conform to the requirements of law or the regulations in this subchapter, the marine inspector lists all requirements which have not been met and presents the list to the owner or a representative.

(d) In any case where the owner of a vessel or his representative desires further clarification of, or reconsideration of any requirement placed against his vessel, he may discuss the matter with the Officer in Charge, Marine Inspection.

§ 169.112 Special consideration.

In applying the provisions of this part, the Officer in Charge, Marine Inspection, may give special consideration to departures from the specific requirements when special circumstances or arrangements warrant such departures and an equivalent level of safety is provided.

§ 169.113 Right of appeal.

Any person directly affected by a decision or action taken under this part, by or on behalf of the Coast Guard, may appeal therefrom in accordance with subpart 1.03 of this chapter.

[CGD 88-033, 54 FR 50381, Dec. 6, 1989]

§ 169.115 Incorporation by reference.

(a) In this subchapter portions or the entire text of certain industrial standards and specifications are referred to as the governing requirements for materials, equipment, tests, or procedures to be followed. These standards and specification requirements specifically referred to in this subchapter are the

Coast Guard, DOT

§ 169.117

governing requirements for the subject matters covered unless specifically limited, modified, or replaced by other regulations in this subchapter.

(b) These materials are incorporated by reference into this part with the approval of the Director of the Federal Register. The Office of the Federal Register publishes a table, "Material Approved for Incorporation by Reference," which appears in the Finding Aids section of this volume. In that table is found citations to the particular sections of this part where the material is incorporated with the approval by the Director of the Federal Register. To enforce any edition other than the one listed in paragraph (c) of this section, notice of change must be published in the FEDERAL REGISTER and the material must be made available. All approved material is on file at the Office of the Federal Register, Washington, DC 20408 and at the U.S. Coast Guard, Office of Design and Engineering Standards, Washington DC 20593.

(c) The materials approved for incorporation by reference in this part are:

- (1) American Boat and Yacht Council (ABYC), P.O. Box 806, 190 Ketchum Ave., Amityville, NY 11701
 - P-1-73—"Safe Installation of Exhaust Systems for Propulsion and Auxiliary Engines" (1973)
 - H-24.9 (g) and (h)—"Fuel Strainers and Fuel Filters" (1975)
 - H-2.5—"Ventilation of Boats Using Gasoline—Design and Construction" (1981)
 - A-1-78—"Marine LPG—Liquefied Petroleum Gas Systems"
 - A-3-70—"Recommended Practices and Standards Covering Galley Stoves"
 - A-22-78—"Marine CNG—Compressed Natural Gas Systems"
- (2) National Bureau of Standards, c/o Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402
 - Special Pub. 440 (SD Cat. No. C13.10:490), "Color: Universal Language and Dictionary of Names", 1976
- (3) National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269

302—"Pleasure and Commercial Motor Craft," Chapter 6 (1980)

306—"Control of Gas Hazards on Vessels" (1980)

70—"National Electrical Code," Article 310-8 and Table 310-13 (1980)

- (4) Naval Publications and Forms Center, Customer Service Code 1052, 5801 Tabor Ave., Philadelphia, PA 19120

Federal Specification ZZ-H-451 "Hose, Fire, Woven-Jacketed Rubber or Cambric-Lined, with Couplings, F."

- (5) Underwriters Laboratories, 333 Pfingsten Road, Northbrook, IL 60062

UL 19-78—"Woven Jacketed, Rubber Lined Fire Hose"

[CGD 83-005, 51 FR 896, Jan. 9, 1986, as amended by CGD 95-072, 60 FR 50468, Sept. 29, 1995; CGD 96-041, 61 FR 50734, Sept. 27, 1996]

§ 169.117 OMB control numbers.

(a) *Purpose.* This section collects and displays the control numbers assigned to information collection and record-keeping requirements in this subchapter by the Office of Management and Budget (OMB) pursuant to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*). The Coast Guard intends that this section comply with the requirements of 44 U.S.C. 3507(f) which requires that agencies display a current control number assigned by the Director of OMB for each approved agency information collection requirement.

(b) *Display.*

46 CFR part—	OMB control No.
§ 169.111	2115-0517
§ 169.201	2115-0517
§ 169.205	2115-0007, 2115-0517, 2115-0546
§ 169.211	2115-0517
§ 169.213	2115-0517
§ 169.215	2115-0517
§ 169.217	2115-0517
§ 169.218	2115-0546
§ 169.219	2115-0546
§ 169.233	2115-0554
§ 169.235	2115-0517
§ 169.305	2115-0095
§ 169.509	2115-0132
§ 169.807	2115-0003
§ 169.813	2115-0546
§ 169.840	2115-0589
§ 169.841	2115-0546, 2115-0071
§ 169.857	2115-0546.

§ 169.119

[CGD 83-005, 51 FR 896, Jan. 9, 1986, as amended by CGD 88-072, 53 FR 34298, Sept. 6, 1988; CGD 89-037, 57 FR 41824, Sept. 11, 1992]

§ 169.119 Vessel status.

For the purpose of 46 U.S.C. 11101, 46 App. U.S.C. 291 and 46 App. U.S.C. 883 a sailing school vessel is not deemed a merchant vessel or a vessel engaged in trade or commerce.

§ 169.121 Loadlines.

Sailing school vessels must meet the applicable loadline regulations contained in Subchapter E (Load Lines) of this chapter.

Subpart 169.200—Inspection and Certification

CERTIFICATE OF INSPECTION

§ 169.201 When required.

(a) No sailing school vessel shall be operated without a valid Certificate of Inspection, Form CG-3753.

(b) Except as noted in this subpart, each sailing school vessel inspected and certificated under the provisions of this subchapter must, during the tenure of the certificate, be in full compliance with the terms of the certificate when carrying six or more individuals who are sailing school students or sailing school instructors.

(c) If necessary to prevent delay of the vessel, a temporary Certificate of Inspection, Form CG-854, is issued pending the issuance and delivery of the regular Certificate of Inspection, Form CG-3753. The temporary certificate is carried in the same manner as the regular certificate and is considered the same as the regular certificate of inspection which it represents.

§ 169.203 Description.

The certificate of inspection issued to a vessel describes the vessel, the route which it may travel, the minimum manning requirements, the major lifesaving equipment carried, the minimum fire extinguishing equipment and life preservers required to be carried, the maximum number of sailing school students and instructors and the maximum number of persons which may be carried, the name of the owner and operator, and such conditions of oper-

46 CFR Ch. I (10-1-98 Edition)

ations as may be determined by the Officer in Charge, Marine Inspection.

§ 169.205 How to obtain or renew.

(a) A qualified organization attempting to obtain or renew a certificate of inspection for a vessel must submit to the Coast Guard Officer in Charge, Marine Inspection located in or nearest the port at which the inspection is to be made, the following—

(1) An application for inspection on Form CG-3752; and

(2) Evidence that the vessel has been designated as a sailing school vessel or an application for designation, as set forth in § 169.218; and

(3) Information concerning the program's age and physical qualifications for students and instructors and the ratio of students to instructors.

(b) The application for initial inspection of a vessel being newly constructed or converted must be submitted prior to the start of such construction or conversion.

(c) The construction, arrangement and equipment of all vessels must be acceptable to the cognizant Officer in Charge, Marine Inspection, as a prerequisite of the issuance of the initial certificate of inspection. Acceptance will be based on the information, specifications, drawings and calculations available to the Officer in Charge, Marine Inspection, and on the successful completion of an initial inspection for certification.

(d) Certificates of inspection will be renewed by the issuance of new certificates of inspection.

(e) The condition of the vessel and its equipment must be acceptable to the cognizant Officer in Charge, Marine Inspection, as a prerequisite of the certificate of inspection renewal. Acceptance will be based on the condition of the vessel as found at the inspection for certification.

§ 169.207 Period of validity.

(a) Certificates of inspection are issued for a period of two years.

(b) Certificates of inspection may be revoked, or suspended and withdrawn

by the Officer in Charge, Marine Inspection, at any time for noncompliance with the provisions of this subchapter or requirements established thereunder.

§ 169.209 Routes permitted.

(a) The area of operation for each vessel is designated by the Officer in Charge, Marine Inspection and recorded on its Certificate of Inspection. Each area of operation is described on the Certificate of Inspection under the major headings "exposed waters," "partially protected waters," or "protected waters," as applicable. Further limitations imposed or extensions granted are described by reference to bodies of waters, geographical points, distance from geographical points, distances from land, depths of channel, seasonal limitations, etc.

(b) Operation of vessels on routes of lesser severity than those specifically described or designated on the Certificate of Inspection are permitted, unless expressly prohibited on the Certificate of Inspection. The general order of severity is: exposed, partially protected, and protected waters.

§ 169.211 Permit to proceed for repair.

(a) The Officer in Charge, Marine Inspection, may issue a permit to proceed to another port for repair, Form CG-948, to a vessel if in his judgment it can be done with safety even if the Certificate of Inspection of the vessel has expired or is about to expire.

(b) The permit is issued only upon the written application of the master, owner, or agent of the vessel.

(c) The permit states upon its face the conditions under which it is issued and that guests may not be carried when operating under the permit. The permit must be carried in a manner similar to that described in § 169.217(a) for a certificate of inspection.

§ 169.213 Permit to carry excursion party.

(a) A vessel may be permitted to engage in a temporary excursion operation with a greater number of persons and/or on a more extended route than permitted by its certificate of inspection when in the opinion of the Officer in Charge, Marine Inspection, the oper-

ation can be undertaken with safety. A "Permit To Carry Excursion Party" Form CG-949, is a prerequisite of such an operation.

(b) Any Officer in Charge, Marine Inspection, having jurisdiction may issue a permit to carry an excursion party upon the written application of the operator, owner or agent of the vessel.

(c) The OCMI will reevaluate the vessel's sailing instruction program to ensure that the permit fits within the scope of the training program and that the vessel continues to meet the definition of a sailing school vessel.

(d) The OCMI may require an inspection prior to the issuance of a permit to carry an excursion party.

(e) The permit states upon its face the conditions under which it is issued, a reminder about the prohibition against carrying passengers, the number of persons the vessel may carry, the crew required, and additional life-saving or safety equipment required, the route for which the permit is granted, and the dates on which the permit is valid.

(f) The permit must be carried with the certificate of inspection. Any vessel operating under a permit to carry an excursion party must be in full compliance with the terms of its certificate of inspection as supplemented by the permit.

§ 169.215 Certificate of inspection amendment.

(a) An amended certificate of inspection may be issued at any time by any Officer in Charge, Marine Inspection. The amended certificate of inspection replaces the original. An amended certificate of inspection may be issued to authorize and record a change in the character of a vessel or in its route, equipment, ownership, operator, etc., from that specified in the current certificate of inspection.

(b) A request for an amended certificate of inspection must be made to the Officer in Charge, Marine Inspection, by the master, operator, owner, or agent of the vessel at any time there is a change in the character of a vessel or in its route, equipment, ownership, operation etc., as specified in its current certificate of inspection.

§ 169.217

(c) The OCMI may require an inspection prior to the issuance of an amended certificate of inspection.

§ 169.217 Posting.

The certificate of inspection must be framed under glass or other suitable transparent material and posted in a conspicuous place on the vessel except on open boats where the certificate may be retained in a watertight container, which is secured to the vessel.

LETTER OF DESIGNATION

§ 169.218 Procedures for designating sailing school vessels.

(a) Upon written request by a qualified institution, a determination is made by the OCMI whether the vessel may be designated as a sailing school vessel.

(b) The request should contain sufficient information to allow the OCMI to make this determination. At a minimum the following items must be submitted:

(1) A detailed description of the vessel, including its identification number, owner, and charterer.

(2) A specific operating plan stating precisely the intended use of the vessel and the intended course of instruction for sailing school students.

(3) A copy of the Internal Revenue Service designation as a non-profit, tax-exempt, organization under sections 501(a) and 501(c)(3) of the Internal Revenue Code.

(4) An affidavit certifying that the owner or charterer has financial resources to meet any liability incurred for death or injury to sailing school students or sailing school instructors on voyages aboard the vessel, in an amount not less than \$50,000 for each student and instructor.

(5) Any additional information as requested by the Officer in Charge, Marine Inspection.

(c) If a designation is granted it is indicated on the certificate of inspection and remains valid for the duration of the certificate, provided all operating conditions remain unchanged.

(d) In the event of a change, the institution must advise the OCMI who issued the designation. After reviewing the pertinent information concerning

46 CFR Ch. I (10–1–98 Edition)

the change, the OCMI shall determine if the vessel is eligible to retain its designation as a sailing school vessel.

§ 169.219 Renewal of letter of designation.

At least 60 days prior to the expiration date of the certificate of inspection, a request for renewal must be submitted in the same manner as described in § 169.218. If the request for renewal is submitted to the OCMI who made the initial determination and all operating conditions remain unchanged, the information need not be resubmitted.

INSPECTION FOR CERTIFICATION

§ 169.220 General.

(a) An inspection is required before the issuance of a certificate of inspection.

(b) An inspection for certification is not made until after receipt of the information required in § 169.205(a) of this subchapter.

§ 169.221 Initial inspection for certification.

(a) The initial inspection includes an inspection of the hull structure, yards, masts, spars, rigging, sails, machinery, and equipment, including unfired pressure vessels.

(b) The initial inspection of a vessel being newly constructed or converted normally consists of a series of inspections during the construction or conversion.

(c) The inspection ensures that the vessel and its equipment comply with the regulations in this subchapter to the extent they are applicable to the vessel being inspected, and are in accordance with approved plans. The inspection also ensures that the materials, workmanship and condition of all parts of the vessel and its machinery and equipment are in all respects satisfactory for the service intended, and that the vessel is in possession of a valid certificate issued by the Federal Communications Commission, if required.

(d) Before construction is started, the owner, operator, or builder must develop plans indicating the proposed arrangement and construction of the vessel. This list of plans to be developed and the required disposition of these plans are set forth in § 169.305.

§ 169.222 Scope of inspection for certification.

Items normally included in an Inspection for Certification are:

- (a) Structure.
- (b) Watertight integrity.
- (c) Pressure vessels and appurtenances.
- (d) Piping.
- (e) Auxiliary machinery.
- (f) Steering apparatus.
- (g) Electrical installations.
- (h) Lifesaving appliances.
- (i) Navigation equipment.
- (j) Fire detecting and extinguishing systems.
- (k) Pollution prevention equipment.
- (l) Sanitary conditions.
- (m) Fire hazards.
- (n) Verification of valid certificates issued by the Federal Communications Commission.
- (o) Lights and signals required by navigation rules.
- (p) Bilge and ballast systems.
- (q) Rigging, yards, masts, spars, and sails.

§ 169.223 Subsequent inspections for certification.

An inspection for renewal of a certificate of inspection includes an inspection of the structure, machinery, yards, spars, masts, rigging, sails, and equipment. The inspection ensures that the vessel is in satisfactory condition, fit for the service intended and complies with the applicable regulations in this subchapter.

REINSPECTION

§ 169.225 When required.

At least one reinspection shall be made on each sailing school vessel holding a valid certificate of inspection. The inspection, when possible, will be made between the tenth and fourteenth month of the period for

which the certificate is valid. The owner, operator, or master must contact the OCMI to arrange for this inspection.

§ 169.227 Scope.

The scope of the reinspection is the same as the inspection for certification.

DRYDOCKING OR HAULING OUT

§ 169.229 Drydock examination and internal structural examination intervals.

(a) Except as provided for in paragraphs (b) through (e) of this section, each vessel must undergo drydock and internal structural examinations as follows:

(1) Vessels that operate in salt water must undergo two drydock and two internal structural examinations within any five year period. No more than three years may elapse between any two examinations.

(2) Vessels that operate in fresh water at least six months in every 12 month period since the last drydock examination must undergo drydock and internal structural examinations at intervals not to exceed five years.

(b) Vessels with wooden hulls must undergo two drydock and two internal structural examinations within any five year period regardless of the type of water in which they operate. No more than three years may elapse between any two examinations.

(c) If, during an internal structural examination damage or deterioration to the hull plating or structural members is discovered, the Officer in Charge, Marine Inspection, may require the vessel to be drydocked or otherwise taken out of service to further assess the extent of the damage and to effect permanent repairs.

(d) Each vessel which has not met with the applicable examination schedules in paragraphs (a) through (c) of this section because it is on a voyage, must undergo the required examinations upon completion of the voyage.

§ 169.231

(e) The Commandant (G-MOC) may authorize extensions to the examination intervals specified in paragraphs (a) and (b) of this section.

[CGD 84-024, 52 FR 39656, Oct. 23, 1987, as amended at 53 FR 32232, Aug. 24, 1988; CGD 95-072, 60 FR 50468, Sept. 29, 1995; CGD 96-041, 61 FR 50734, Sept. 27, 1996]

§ 169.231 Definitions relating to hull examinations.

As used in the part—

(a) *Drydock examination* means hauling out a vessel or placing a vessel in a drydock or slipway for an examination of all accessible parts of the vessel's underwater body and all through-hull fittings, sea chests, sea valves, sea strainers, and valves for the emergency bilge suction.

(b) *Internal structural examination* means an examination of the vessel while afloat or in drydock and consists of a complete examination of the vessel's main strength members, including the major internal framing, the hull plating, voids, and ballast tanks, but not including cargo or fuel oil tanks.

[CGD 84-024, 52 FR 39656, Oct. 23, 1987, as amended at 53 FR 32232, Aug. 24, 1988]

§ 169.233 Notice and plans required.

(a) The master, owner, operator, or agent of the vessel shall notify the Officer in Charge, Marine Inspection, whenever the vessel is to be drydocked regardless of the reason for drydocking.

(b) Each vessel, except barges, that holds a Load Line Certificate must have on board a plan showing the vessel's scantlings. This plan must be made available to the Coast Guard marine inspector whenever the vessel undergoes a drydock examination or internal structural examination or whenever repairs are made to the vessel's hull.

(c) Each barge that holds a Load Line Certificate must have a plan showing the barge's scantlings. The plan need not be maintained on board the barge but must be made available to the Coast Guard marine inspector whenever the barge undergoes a drydock examination or internal structural exam-

46 CFR Ch. I (10-1-98 Edition)

ination or whenever repairs are made to the barge's hull.

[CGD 84-024, 52 FR 39656, Oct. 23, 1987]

§ 169.234 Integral fuel oil tank examinations.

(a) Each fuel oil tank with at least one side integral to the vessel's hull and located within the hull ("integral fuel oil tank") is subject to inspection as provided in this section. The owner or operator of the vessel shall have the tanks cleaned out and gas freed as necessary to permit internal examination of the tank or tanks designated by the marine inspector. The owner or operator shall arrange for an examination of the fuel tanks of each vessel during an internal structural examination at intervals not to exceed five years.

(b) Integral non-double-bottom fuel oil tanks need not be cleaned out and internally examined if the marine inspector is able to determine by external examination that the general condition of the tanks is satisfactory.

(c) Double-bottom fuel oil tanks on vessels less than 10 years of age need not be cleaned out and internally examined if the marine inspector is able to determine by external examination that the general condition of the tanks is satisfactory.

(d) All double-bottom fuel oil tanks on vessels 10 years of age or older but less than 15 years of age need not be cleaned out and internally examined if the marine inspector is able to determine by internal examination of at least one forward double-bottom fuel oil tank, and by external examination of all other double-bottom fuel oil tanks on the vessel, that the general condition of the tanks is satisfactory.

(e) All double-bottom fuel oil tanks on vessels 15 years of age or older need not be cleaned out and internally examined if the marine inspector is able to determine by internal examination of at least one forward, one amidships, and one aft double-bottom fuel oil tank, and by external examination of all other double-bottom fuel oil tanks on the vessel, that the general condition of the tanks is satisfactory.

[CGD 84-024, 52 FR 39656, Oct. 23, 1987, as amended at 53 FR 32232, Aug. 24, 1988]

REPAIRS AND ALTERATIONS

§ 169.235 Permission required.

(a) Repairs or alterations to the hull, machinery, or equipment which affects the safety of the vessel may not be made without the knowledge and approval of the Officer in Charge, Marine Inspection.

(b) Drawings, sketches or written specifications describing the alterations in detail must be submitted to the OCMI. Proposed alterations must be approved by the Officer in Charge, Marine Inspection, before work is started.

(c) Drawings are not required for repairs or replacements in kind.

§ 169.236 Inspection and testing required.

(a) The provisions of NFPA 306, "Control of Gas Hazards on Vessels," are used as a guide in conducting the inspections and issuing certificates required by this section.

(b) Until an inspection has been made to determine that the operations can be undertaken safely, no alterations, repairs, or other operations involving riveting, welding, burning, or other fire-producing actions may be made—

(1) Within or on the boundaries of fuel tanks; or

(2) To pipelines, heating coils, pumps, fittings, or other appurtenances connected to fuel tanks.

(c) Inspections must be conducted as follows:

(1) In ports or places in the United States or its territories and possessions, the inspection must be made by a marine chemist certificated by the National Fire Protection Association; however, if the services of such certificated marine chemist are not reasonably available, the Officer in Charge, Marine Inspection, upon the recommendation of the vessel owner and his contractor on their representative, may authorize a person to inspect the particular vessel. If the inspection indicates that the operations can be undertaken with safety, a certificate setting forth this fact in writing must be issued by the certified marine chemist or the authorized person before the work is started. The certificate must include any requirements necessary to

reasonably maintain safe conditions in the spaces certified throughout the operation, including any precautions necessary to eliminate or minimize hazards that may be present from protective coatings or residues from cargoes.

(2) When not in a port or place in the United States or its territories and possessions, and when a marine chemist or a person authorized by the Officer in Charge, Marine Inspection, is not reasonably available, the senior officer present shall conduct the inspection and enter the results of the inspection in the vessel's logbook.

(d) It is the responsibility of the senior officer present to secure copies of certificates issued by the certified marine chemist or a person authorized by the Officer in Charge, Marine Inspection. It is the responsibility of the senior officer present, insofar as the persons under his control are concerned, to maintain a safe condition on the vessel by full observance of all requirements listed by the marine chemist in the certificate.

INSPECTIONS

§ 169.237 Inspection standards.

Vessels are inspected for compliance with the standards required by this subchapter. Items not covered by standards in this subchapter must be in accordance with good marine practice and acceptable to the Officer in Charge, Marine Inspection.

§ 169.239 Hull.

At each inspection for certification, the vessel must be afloat and ready for the following tests and inspections of the hull structure and its appurtenances:

(a) All accessible parts of the exterior and interior of the hull, the watertight bulkheads, and weather deck are examined. Where the internals of the vessel are completely concealed, sections of the lining or ceiling may be removed or the parts otherwise probed or exposed so that the inspector may be satisfied as to the condition of the hull structure.

(b) All watertight closures in the hull, decks and bulkheads are examined and operated.

(c) The condition of the superstructure, masts, and similar arrangements constructed on the hull is checked. All spars, standing rigging, running rigging, blocks, fittings, and sails, including storm sails are inspected.

(d) All railings and bulwarks and their attachment to the hull structure are inspected. Special attention is paid to ensure that guards or rails are provided in all dangerous places.

(e) All weathertight closures above the weather deck are inspected. The provisions for drainage of sea water from the exposed decks are checked.

§ 169.241 Machinery.

(a) At each initial and subsequent inspection for certification the Coast Guard examines and tests the following items to the extent necessary to determine that they are in proper operating condition and fit for the service for which they are intended:

(1) *Engine starting system.* Alternate methods of starting are checked.

(2) *Engine control mechanisms.* Mechanisms are operationally tested and visually examined.

(3) *Auxiliary machinery.* All machinery essential to the routine operation of the vessel is checked.

(4) *Fuel systems.* Tanks, tank vents and other appurtenances, piping and pipe fittings are examined. The fuel systems for the auxiliary propulsion engines and all other fuel systems installed are checked. All valves in the fuel lines are tested by operating locally and at remote operating positions.

(5) *Sea valves and bulkhead closure valves.* All overboard discharge and intake valves are checked.

(6) *Bilge and drainage systems.* The means provided for pumping bilges are operationally tested. All suction strainers are examined.

(b) During all inspections special attention is paid to ensure that no fire hazards exist and that guards or protective devices are provided in all hazardous places.

§ 169.243 Electrical.

At each inspection for certification the following items are examined and tested to the extent necessary to deter-

mine that they are in proper operating condition, safe electrical condition, and fit for the service for which they are intended:

(a) *Electrical cable.* All cable is examined as far as practicable without undue disturbance of the cable or electrical apparatus.

(b) *Overload or circuit protective devices.* Circuit breakers are tested by manual operation and fuses examined visually. The ratings of fuses are checked to determine suitability for the service intended.

(c) *Rotating machinery.* Rotating electrical machinery essential to the routine operation of the vessel is examined.

(d) *Generators, etc.* All generators, motors, lighting fixtures and circuit interrupting devices located in spaces or areas which may contain flammable vapors are checked.

(e) *Storage batteries.* Batteries are checked for condition and security of stowage.

(f) *Fire detection and alarm system.* Electrical apparatus, which operates as part of or in conjunction with a fire detection or alarm system installed on board the vessel, is operationally tested. The test is applied, in a manner to simulate, as closely as practicable, the actual operation in case of fire.

§ 169.245 Lifesaving equipment.

At each inspection for certification the following tests and inspections of lifesaving equipment are conducted:

(a) All air tank buoyant units of all lifesaving appliances are tested for airtightness.

(b) Each lifeboat is lowered to near the water and loaded with its allowed capacity, evenly distributed throughout the length. The total weight used is at least equal to the allowed capacity of the lifeboat considering persons to weigh 75 kg (165 pounds) each. The lifeboat is then lowered into the water until it is afloat and released from the falls.

(c) Each personal flotation device is examined to determine its serviceability. If found to be satisfactory, it is stamped "Passed," together with the date and the port. If found to be unsatisfactory, the personal flotation device must be removed from the vessel's

equipment and repaired. If it is beyond repair it must be destroyed in the presence of the Coast Guard inspector.

(d) Each lifeboat winch electrical control apparatus is opened and inspected.

(e) Where gravity davits are installed, it must be demonstrated that the lifeboat can be swung out and lowered from any stopped position by merely releasing the brake on the lifeboat winch. The use of force to start the davits or the lifeboat winch is not permitted.

(f) Inflatable liferaft containers are examined for defects and the inspector verifies that the inflatable liferafts and hydraulic releases, if installed, have been serviced at an approved facility in accordance with the provisions of subparts 160.051 and 160.062, respectively, of this chapter.

(g) All other items of lifesaving equipment are examined to determine that they are in suitable condition.

§ 169.247 Firefighting equipment.

(a) At each inspection for certification and at such other times as considered necessary all fire-extinguishing equipment is inspected to ensure it is in suitable condition. Tests may be necessary to determine the condition of the equipment. The inspector verifies that the tests and inspections required in Tables 169.247 (a)(1) and (a)(2) of this subchapter have been conducted by a qualified servicing facility at least once every twelve months.

(1) Hand portable fire extinguishers and semi-portable fire extinguishing systems are examined for excessive corrosion and general condition.

(2) All parts of the fixed fire-extinguishing systems are examined for excessive corrosion and general condition.

(3) Piping, controls, valves, and alarms on all fire-extinguishing systems are checked to be certain the system is in operating condition.

(4) The fire main system is operated and the pressure checked at the most remote and highest outlets.

(5) Each firehose is subjected to a test pressure equivalent to its maximum service pressure.

TABLE 169.247(A)(1)—PORTABLE EXTINGUISHERS

Type unit	Test
Foam	Discharge. Clean hose and inside of extinguisher thoroughly. Recharge.
Carbon dioxide	Weigh cylinders. Recharge if weight loss exceeds 10 pct of weight of charge. Inspect hose and nozzle to be sure they are clear.
Dry chemical (cartridge-operated type).	Examine pressure cartridge and replace if end is punctured or if cartridge is otherwise determined to have leaked or to be in unsuitable condition. Inspect hose and nozzle to see they are clear. Insert charged cartridge. Be sure dry chemical is free-flowing (not caked) and chamber contains full charge.
Dry chemical (stored pressure).	See that pressure gage is in operating range. If not, or if seal is broken, weigh or otherwise determine that full charge of dry chemical is in extinguisher. Recharge if pressure is low or if dry chemical is needed.
HALON 1211 or HALON 1301).	See that pressure gage, if provided, is in operating range. Recharge if pressure is low. Weigh cylinder. Recharge if weight loss exceeds 10 pct of weight of charge. Inspect hose and nozzle to ensure they are clear.

TABLE 169.247(A)(2)—FIXED SYSTEMS

Type system	Test
Carbon dioxide or HALON 1301.	Weigh cylinders. Recharge if weight loss exceeds 10 pct of weight of charge.

§ 169.249 Pressure vessels.

Pressure vessels must meet the requirements of part 54 of this chapter. The inspection procedures for pressure vessels are contained in subpart 61.10 of this chapter.

§ 169.251 Steering apparatus.

At each inspection for certification the steering apparatus is inspected and operationally tested to determine that its condition is satisfactory and that it is fit for the service intended.

§ 169.253 Miscellaneous systems and equipment.

(a) At each inspection for certification all items in the ship's outfit, such as ground tackle, navigation lights, compass, etc., which are required to be carried by the regulations in this subchapter are examined and

tested as necessary to determine that they are fit the service intended.

(b) Approved work vests, where carried, are inspected as provided in § 169.556.

§ 169.255 Sanitary inspection.

At each inspection for certification and reinspection quarters, toilet and washing spaces, galleys, serving pantries, lockers, etc., are examined to determine that they are serviceable and in a sanitary condition.

§ 169.257 Unsafe practices.

(a) At each inspection for certification, reinspection, and at every other vessel inspection all observed unsafe practices and hazardous situations must be corrected.

(b) At each inspection for certification and at every other vessel inspection the bilges and other spaces are examined to see that there is no accumulation of oil or other matter which might create a fire hazard.

§ 169.259 Limitations of inspections.

The OCMI may require that a vessel and its equipment meet any test or inspection deemed necessary to determine that they are suitable for the service in which they are to be employed.

Subpart 169.300—Construction and Arrangement

PLANS

§ 169.305 Plans required.

(a) Except as provided in paragraphs (b) and (c) of this section the owner or builder shall, before the start of construction or before the initial inspection of the vessel, submit to the Officer in Charge, Marine Inspection of the inspection zone where the vessel is to be inspected, at least one copy of each of the following plans:

- (1) Midship section.
- (2) Outboard profile.
- (3) Inboard profile.
- (4) Arrangement of decks.
- (5) Lifesaving equipment installation and arrangement.
- (6) Machinery installation.
- (7) Electrical installation.
- (8) Fire control plan.

(9) Fuel tanks.

(10) Piping systems.

(11) Hull penetrations and shell connections.

(12) Lines and offsets, curves of form, and capacities of the tanks including size and location on vessel.

(13) Masts, including integration into the ship's structure.

(14) Rigging plan showing sail areas and centers of effort as well as the arrangement, dimensions, and connections of the standing rigging.

(b) For vessels less than 65 feet in length, the owner may submit specifications, sketches, photographs, line drawings or written descriptions in lieu of any of the required drawings provided the required information is adequately detailed and acceptable to the Officer in Charge, Marine Inspection.

(c) The Officer in Charge, Marine Inspection, may waive submission of some or all of the structural plans called for by paragraph (a) of this section for an existing vessel with a history of at least 5 years of safe operation, or if the design and construction of the vessel are essentially similar to a vessel which has a proven record of safe operation in similar service upon similar waters.

§ 169.307 Plans for sister vessels.

Plans are not required for any vessel which is a sister ship to a vessel, provided that—

- (a) The approved plans for the original vessels are already on file at any Marine Inspection Office;
- (b) The owner of the plans authorizes their use for the new construction;
- (c) The regulations have not changed since the original plan approval; and
- (d) There are no major modifications to any of the systems used.

HULL STRUCTURE

§ 169.309 Structural standards.

(a) Compliance with the standards established by a recognized classification society will, in general, be considered satisfactory evidence of the structural adequacy of a vessel.

(b) Masts, posts and other supporting structures are to have adequate

strength to withstand the highest loadings imposed by the sail systems during all normal and emergency conditions. Particular attention must be given to the integration of the masts and rigging into the hull structure. The hull structure must be adequately reinforced and stiffened locally to ensure sufficient strength and resistance to plate buckling.

(c) The design, materials, and construction of masts, yards, booms, bowsprits, and standing rigging must be suitable for the intended service. Detailed calculations with respect to the strength of the sail system may be required. Approval by a recognized classification society may be considered satisfactory evidence of the adequacy of the sail system.

(d) When scantlings differ from established standards and it can be demonstrated that a craft approximating the same size, power and displacement has been built to the proposed scantlings and has been in satisfactory service, insofar as structural adequacy is concerned, for a period of at least 5 years, the proposed scantling may be approved. A detailed structural analysis may be required.

(e) Special consideration will be given to the structural requirements of vessels not contemplated by the standards of a recognized classification society and to the use of materials not specially included in these standards.

§ 169.311 Fire protection.

(a) The general construction of the vessel must be designed to minimize fire hazards. Each vessel which carries more than 100 persons or has overnight accommodations for more than 49 persons must meet the requirements of subpart 72.05 of this chapter. Each vessel which is certificated to carry 100 persons or less or had overnight accommodations for less than 50 persons must meet the requirements of § 169.323.

(b) A fire detector, listed by a recognized testing laboratory, must be installed in each unmanned engine space.

(c) Smoke detectors, listed by a recognized testing laboratory, must be installed in each berthing compartment, sail locker, and public area.

(d) Internal combustion engine exhausts, boiler and galley uptakes, and similar sources of ignition must be kept clear of and suitably insulated from any woodwork or other combustible matter.

(e) Lamp, paint, oil lockers and similar compartments must be constructed of metal or wholly lined with metal.

[CGD 83-005, 51 FR 897, Jan. 9, 1986; 51 FR 3785, Jan. 30, 1986]

§ 169.313 Means of escape.

(a) Except as provided by paragraph (f) of this section, there must be at least two means of escape from all areas generally accessible to persons onboard. At least one means of escape must be independent of watertight doors and lead directly to the open deck. Windows and windshields of sufficient size and proper accessibility may be used as one avenue of escape.

(b) The two means of escape must be as widely separated as practical to minimize the possibility of one incident blocking both escapes.

(c) Except as provided by paragraph (d) of this section, a vertical ladder and deck scuttle may not be designated as one of the means of escape.

(d) A vertical ladder and deck scuttle may be used as a second means of escape if—

(1) The primary means of escape is an enclosed stairtower or stairway;

(2) The installation of two stairways is impracticable;

(3) The scuttle is located where it can not be interfered with; and

(4) The scuttle is fitted with a quick-acting release and a hold-back to hold the scuttle in an open position.

(e) The required means of escape must not have locking devices.

(f) Where the length of the compartment is less than 12 feet, one vertical means of escape is acceptable provided that—

(1) There is no source of fire in the space, such as a galley stove, heater, etc., and the vertical escape is remote from the engine or fuel tank space, and

(2) The arrangement is such that the installation of two means of escape does not materially improve the safety of the vessel or those on board.

(g) Dead end corridors or the equivalent, more than 40 feet in length are prohibited.

(h) Each means of escape must be of adequate size to accommodate rapid evacuation.

(i) Each vertical ladder must have rungs that are:

(1) At least 16 inches in length;

(2) Not more than 12 inches apart, uniform for the length of the ladder;

(3) At least 3 inches from the nearest permanent object in back of the ladder; and

(4) Except when unavoidable obstructions are encountered, there must be at least 4½ inches clearance above each rung.

§ 169.315 Ventilation (other than machinery spaces).

(a) All enclosed spaces within the vessel must be properly ventilated in a manner suitable for the purpose of the space.

(b) A means must be provided to close off all vents and ventilators.

(c) Living spaces must be ventilated by a mechanical system unless it can be shown that a natural system will provide adequate ventilation in all ordinary weather conditions. Provided that paragraph (a) of this section is satisfied, a vessel having only a natural ventilation system must satisfy the following: $V/A \geq 1.4$ where V is the total area of the vents in square inches and A is the product in square feet of the vessel's design waterline length times its maximum beam.

LIVING SPACES

§ 169.317 Accommodations.

(a) Quarters must have sufficient fresh air, light and heat. Quarters must not be located forward of the collision bulkhead or farther forward in the vessel than a vertical plane located at 5 percent of the vessel's loadline length abaft the forward side of the stem. The space must not be located totally below the deepest load waterline.

(b) Bulkheads separating accommodations from machinery spaces, paint lockers, storerooms, washrooms, and toilet facilities are to be odorproof.

(c) All quarters are to be properly drained, odorproof and protected from heat and noise.

(d) Each person on board must have a separate berth which is of sufficient size and generally clear of all pipes, ventilation ducts and other installations.

(e) Each bunk must be constructed of wood, fiberglass or metal. If fitted with a mattress, the mattress must be covered with material which has been treated to give it fire resistant properties and which will provide the mattress with a reasonably smooth surface. There must be a minimum vertical distance between bunks of 24 inches.

(f) A means of access must be provided for each berthing arrangement where the upper berth is more than 60 inches above the deck.

(g) The construction and arrangement must allow free and unobstructed access to each berth. Each berth must be immediately adjacent to an aisle leading to a means of escape from the living area.

(h) A properly arranged hammock may be used as a berth.

§ 169.319 Washrooms and toilets.

(a) Sailing school vessels must have one toilet and on washbasin for every 20 persons. Each toilet and washbasin must have adequate plumbing.

(b) Each washroom and toilet room must properly drain and the scupper to the washroom must be of sufficient size and situated in the lowest part of the space.

(c) Each sailing school vessel must meet the applicable requirements of Title 33, Code of Federal Regulations, part 159.

§ 169.323 Furniture and furnishings.

Each sailing school vessel certificated to carry 100 persons or less or having overnight accommodations for less than 50 persons must meet the following requirements:

(a) Except as provided by paragraph (b) of this section, all free-standing furniture must be constructed of non-combustible material. Upholstery and padding used in furniture must be of fire resistant materials.

(b) Existing solid wooden furniture may be retained on existing vessels.

(c) Draperies must be fabricated of fire resistant fabrics.

(d) Rugs and carpets must be of wool or other material having equivalent fire resistant qualities.

(e) Trash receptacles must be constructed of non-combustible materials with solid sides and bottoms and have solid noncombustible covers.

RAILS AND GUARDS

§ 169.327 Deck rails.

(a) All rails or lifelines must be at least 30 inches high and permanently supported by stanchions at intervals of not more than 7 feet. Stanchions must be through bolted or welded to the deck.

(b) Rails or lifelines must consist of evenly spaced courses. The spacing between courses must not be greater than 12 inches. The opening below the lowest course must not be more than 9 inches. Lower rail courses are not required where all or part of the space below the upper rail is fitted with a bulwark, chain link fencing, wire mesh, or an equivalent.

(c) Small vessels of the open type and vessels of unusual construction must have rails or equivalent protection as considered necessary by the Officer in Charge, Marine Inspection.

§ 169.329 Storm rails.

Suitable storm rails or hand grabs must be installed where necessary in all passageways, at deckhouse sides, and at ladders and hatches where persons might have normal access.

§ 169.331 Guards in hazardous locations.

Each exposed hazard, such as gears or machinery, must be properly protected with covers, guards, or rails.

Subpart 169.400—Watertight Integrity, Subdivision, and Stability

§ 169.401 Applicability.

Each vessel must meet the applicable requirements in Subchapter S, parts 170–174, of this chapter.

Subpart 169.500—Lifesaving and Firefighting Equipment

LIFESAVING EQUIPMENT—GENERAL

§ 169.505 Equipment installed but not required.

Each item of lifesaving equipment installed on board a vessel must be of an approved type.

§ 169.507 Responsibility of master.

The master or operator shall ensure that the lifeboats, liferafts, davits, falls, personal flotation devices, and other lifesaving appliances are at all times ready for use, and that all equipment required by the regulations in this subchapter is provided, maintained, serviced, and replaced as indicated.

§ 169.509 Approval for repairs and alterations.

No extensive repairs or alterations, except in an emergency, may be made to any item of lifesaving equipment without advance notice to the Officer in Charge, Marine Inspection. Repairs and alterations must be made to the original standard of construction and tested in the manner specified in this subpart and applicable requirements in Subchapter Q of this chapter. Emergency repairs or alterations must be reported as soon as practicable to the nearest Officer in Charge, Marine Inspection.

PRIMARY LIFESAVING EQUIPMENT

§ 169.513 Types of primary equipment.

(a) *Lifeboats*. Each lifeboat must be of a type approved under subpart 160.035 of this chapter. Installation and arrangement of each lifeboat including davits and winches must meet the requirements of part 94 of this chapter.

(b) *Inflatable Liferafts*. (1) Each inflatable liferaft must be of a type approved under subpart 160.051 of this chapter.

(2) The inflatable liferaft and liferaft container must show on or near their respective nameplates, marking approved by the Coast Guard that contains—

(i) An approval number consisting of “160.051/” followed by a number that is

greater than 49 followed by a revision number (e.g. 160.051/50/1); or

(ii) An approval number consisting of “160.051/” followed by a number that is smaller than 50 that is followed by a revision number (e.g. 160.051/48/1); the words “MOD TEMP,” and the date that an inspector found that the liferaft met § 160.051–5(c)(4) of this chapter.

(3) Each inflatable liferaft must be marked “Ocean Service,” except that inflatable liferafts on vessels operating on protected waters or partially protected waters may be marked “Limited Service.”

(c) *Life floats.* Each lifefloat must be of a type approved under subpart 160.027 of this subchapter.

§ 169.515 Number required.

(a) Except as provided in paragraph (c) of this section, each vessel must have sufficient lifeboats or inflatable liferafts to accommodate all persons on board.

(b) Each vessel certificated for exposed waters must have additional inflatable liferafts to accommodate 25% of the persons on board or the number of persons accommodated in the largest lifeboat or liferaft, whichever is greater.

(c) Vessels certificated for protected waters only may carry lifefloats of a combined capacity to accommodate all persons on board in lieu of the lifeboats and inflatable liferafts required in paragraph (a) of this section.

§ 169.517 Rescue boat.

All vessels certificated for exposed or partially protected waters service must have a suitable motor rescue boat, except when a motor lifeboat is provided or when, in the opinion of the Officer in Charge, Marine Inspection, the vessel is of such design and operating characteristics that the vessel itself provides a satisfactory man overboard rescue platform.

§ 169.519 Availability.

(a) Each lifeboat, inflatable liferaft, and lifefloat must be kept in good working order and be readily available.

(b) The decks on which lifeboats, liferafts, and lifefloats are carried must be kept clear of obstructions which could interfere with the immediate boarding

and launching of the lifesaving appliances.

§ 169.521 Stowage.

(a) *General.* Each lifeboat, inflatable liferaft, and lifefloat must be stowed so that—

(1) It is capable of being launched within 10 minutes or, in the case of vessels having one compartment subdivision, 30 minutes;

(2) It does not impede the launching or handling of other lifesaving appliances;

(3) It does not impede the marshaling of persons at the embarkation stations, or their embarkation; and

(4) It is capable of being put in the water safely and rapidly even under unfavorable conditions of list and trim.

(b) *Lifeboat stowage.* Each lifeboat must be stowed to meet the following requirements:

(1) Each lifeboat must be attached to a separate set of davits.

(2) Lifeboats must not be stowed in the bow of the vessel nor so far aft as to be endangered by the propellers or overhang of the stern.

(3) Lifeboats must be stowed so that it is not necessary to lift them in order to swing out the davits.

(4) Means must be provided for bringing the lifeboats against the ship's side and holding them there so that persons may safely embark, unless the lifeboats are arranged for boarding at the stowage position.

(5) Lifeboats must be fitted with skates or other suitable means to facilitate launching against an adverse list of up to 15 degrees. However, skates may be dispensed with if, in the opinion of the Commandant, the arrangements ensure that the lifeboats can be satisfactorily launched without them.

(6) Means must be provided outside the machinery space to prevent the discharge of water into the lifeboats while they are being lowered.

(c) *Inflatable liferaft stowage.* Inflatable liferafts must be stowed so that they will float free in the event of the vessel sinking. Stowage and launching arrangements must be to the satisfaction of the Officer in Charge, Marine Inspection.

(d) *Life float stowage.* Each life float must be stowed to meet the requirements of this paragraph.

(1) Each life float must be secured to the vessel by a painter and a float-free link that is—

(i) Certified to meet subpart 160.073 of this chapter;

(ii) Of proper strength for the size of the life float as indicated on its identification tag; and

(iii) Secured to the painter at one end and secured to the vessel on the other end.

(2) The means by which the float-free link is attached to the vessel must—

(i) Have a breaking strength of at least the breaking strength of the painter.

(ii) If synthetic, be of a dark color or of a material certified to be resistant to deterioration from ultraviolet light; and

(iii) If metal, be corrosion resistant.

(3) If the life float does not have a painter attachment fitting, a means for attaching the painter must be provided by a wire or line that—

(i) Encircles the body of the device;

(ii) Will not slip off;

(iii) Has a breaking strength that is at least the breaking strength of the painter; and

(iv) If synthetic, is of a dark color or is of a material certified to be resistant to deterioration from ultraviolet light.

(4) The float-free link described in paragraphs (d)(1) and (d)(2) of this section is not required if the vessel operates solely in waters that have a depth less than the length of the painter.

(5) If the vessel carries more than one life float, the life floats may be grouped and each group secured by a single painter, provided that—

(i) The combined weight of each group of life floats does not exceed 400 pounds;

(ii) Each life float is individually attached to the painter by a line that meets paragraphs (d)(2) and (d)(3) of this section and which is long enough so that each can float without contacting any other life float in the group; and

(iii) The strength of the float-free link and the strength of the painter under paragraphs (d)(1)(ii) and (d)(2) of this section is determined by the com-

bined capacity of the group of life floats.

(6) Each life float, as stowed, must be capable of easy launching. Life floats weighing over 400 pounds must not require lifting before launching.

(7) Life floats must be secured to the vessel only by a painter and lashings that can be easily released or by hydraulic releases. They must not be stowed in more than four tiers. When stowed in tiers, the separate units must be kept apart by spacers.

(8) There must be means to prevent shifting.

(e) *Hydraulic Releases.* Each hydraulic release used in the installation of any inflatable liferaft or life float must meet subpart 160.062 of this chapter.

EQUIPMENT FOR PRIMARY LIFESAVING APPARATUS

§ 169.525 General.

(a) Equipment for primary lifesaving apparatus must kept in good condition.

(b) Lifeboats, inflatable liferafts and lifefloats must be fully equipped before the vessel is navigated and throughout the voyage.

(c) No person may stow in any lifeboat, inflatable liferaft, or lifefloat any article not required by this subpart unless the article is authorized by the OCMI, in good working order, and properly stowed so as not to reduce the seating capacity, the space available to the occupants, or adversely affect the seaworthiness of the lifesaving apparatus.

(d) Loose equipment, except boathooks in lifeboats, must be securely attached to the lifesaving appliance to which it belongs.

§ 169.527 Required equipment for lifeboats.

Lifeboats must be equipped in accordance with Table 169.527. This equipment is described in § 169.529.

TABLE 169.527

Letter identification and item	Exposed and partially protected waters	Protected waters
a—Bailer	1	None
b—Bilge pump	1	None
c—Boathooks	2	1
d—Bucket	2	1
e—Compass and mounting	1	None

TABLE 169.527—Continued

Letter identification and item	Exposed and partially protected waters	Protected waters
f—Ditty bag	1	None
g—Drinking cup	1	None
h—Fire extinguisher (motor-propelled lifeboats only)	2	2
i—First-aid kit	1	None
j—Flashlight	1	None
k—Hatchet	2	1
l—Heaving line	2	None
m—Jackknife	1	None
n—Ladder, lifeboat, gunwale	1	None
o—Lantern	1	1
p—Lifeline	1	1
q—Life preservers	2	2
r—Locker	1	None
s—Mast and sail (oar-propelled lifeboats only)	1	None
t—Matches (boxes)	2	1
u—Mirror, signaling	2	None
v—Oars (units)	1	1
w—Oil, illuminating (quarts)	1	None
x—Oil, storm, (gallons)	1	None
y—Painter	2	1
z—Plug	1	1
aa—Provisions (per person)	2	None
bb—Rowlocks (units)	1	1
cc—Rudder and tiller	1	None
dd—Sea anchor	1	None
ee—Signals, distress, floating orange smoke	2	None
ff—Signals, distress, red hand flare (units)	1	None
gg—Signals, distress, red parachute flare (units)	1	None
hh—Tool kit (motor-propelled lifeboats only)	1	1
ii—Water (quarts per person)	3	None
jj—Whistle, signaling	1	None
kk—Fishing kit	1	None
ll—Cover, protecting	1	None
mm—Signals, lifesaving	1	None

§ 169.529 Description of lifeboat equipment.

(a) *Bailer*. The bailer must have a lanyard attached and must be of sufficient size and suitable for bailing.

(b) *Bilge pump*. Bilge pumps must be approved under subpart 160.044 of this chapter. They must be of the size given in Table 169.529(b) depending upon the capacity of the lifeboat as determined by the six-tenths rule as described in § 160.035–9(b) of this chapter.

TABLE 169.529(b)

Capacity of lifeboat, cubic feet		Bilge pump size
Over—	Not over—	
330	330	1
700	700	2
		3

(c) *Boathooks*. Boathooks must be of the single hook ballpoint type. Boat-

hook handles must be of clear grained white ash, or equivalent, and of a length and diameter as given in Table 169.529(c).

TABLE 169.529(c)

Length of lifeboat, feet		Boathook handles	
Over—	Not over—	Diameter, inches	Length, feet
23	23	1.50	8
29	29	1.75	10
		2	12

(d) *Bucket*. Each bucket must be of heavy gage galvanized iron, or other suitable corrosion-resistant metal, of not less than 2-gallon capacity, and must have a 6-foot lanyard of 12-thread manila or equivalent attached.

(e) *Compass and mounting*. The compass and mounting must be of an approved type.

(f) *Ditty bag*. The ditty bag must consist of a canvas bag or equivalent and must contain a sailmaker's palm, needles, sail twine, marline, and marline spike.

(g) *Drinking cups*. Drinking cups must be enamel coated or plastic, graduated in milliliters or ounces, and provided with lanyards 3 feet in length.

(h) *Fire extinguishers*. Each fire extinguisher must be an approved Type B–C, Size I. One must be attached to each end of the lifeboat.

(i) *First-aid kit*. The first-aid kit must be approved under subpart 160.041 of this chapter.

(j) *Flashlights*. Each flashlight must be approved under § 94.20–15(j) of this chapter. Three spare cells (or one 3-cell battery) and two spare bulbs, stowed in a watertight container, must be provided with each flashlight. Batteries must be replaced yearly during the annual stripping, clearing, and overhaul of the lifeboat.

(k) *Hatchets*. Hatchets must be approved under subpart 160.013 of this chapter. They must be attached to the lifeboat by individual lanyards and be readily available for use, one at each end of the lifeboat.

(l) *Heaving line*. The heaving line must be of adequate strength, 10 fathoms in length, and 1 inch in circumference. It must remain buoyant after being submerged for 24 hours.

(m) *Jackknife*. The jackknife must be approved under subpart 160.043 of this chapter.

(n) *Ladder, lifeboat gunwale*. The lifeboat gunwale ladder must consist of 3 flat wood steps with cut outs for hand holds. The steps must be spaced 12 inches apart and fastened with $\frac{5}{8}$ inch diameter manila rope or equivalent. Each rope end must be tied inside the lifeboat at about amidships with the ladder stowed on top of the side benches and ready for immediate use.

(o) *Lantern*. The lantern must contain sufficient oil to burn for at least 9 hours, and be ready for immediate use. In totally enclosed lifeboats, an interior lighting system may be used in lieu of a lantern.

(p) *Lifeline*. The lifeline must be properly secured to both sides of the lifeboat along its entire length, festooned in bights not longer than 3 feet, with a seine float in each bight. The float may be omitted if the line is of an inherently buoyant material and absorbs lit-

tle or no water. The lifeline must be of a size and strength not less than $\frac{3}{8}$ -inch diameter manila. The bights must hang to within 12 inches of the water when the lifeboat is light.

(q) *Life preservers*. Life preservers must be of an approved type. These preservers are in addition to those required by § 169.539 of this chapter.

(r) *Locker*. The locker must be suitable for the storage and preservation of the small items of equipment required under § 169.527.

(s) *Mast and sail*. A unit, consisting of a standing lug sail together with the necessary spars and rigging, must be provided in accordance with Table 169.529(s). The sails must be of good quality canvas, or other material acceptable to the Commandant, colored Indian Orange (Cable No. 70072, Standard Color Card of America). Rigging must consist of galvanized wire rope not less than three-sixteenths inch in diameter. The mast and sail must be protected by a suitable cover.

TABLE 169.529(S)

Length of lifeboat, feet		Standing lug sail										Com- mer- cial des- igna- tion num- ber	Mast ¹		Yard ¹		Diam- eter, inches			
		Luff and head lengths		Leach length		Foot length		Clew to throat		Length			Length							
										Feet	Inches		Feet	Inches						
Over—	Not over—	Area, square feet	Feet	Inches	Feet	Inches	Feet	Inches	Feet	Inches	Ounces per square yard	Feet	Inches	Feet	Inches	Feet	Inches			
			17	58	5	11	12	1	8	10	10	14.35	10	11	2	3	6	11	2	
			19	74	6	8	13	8	10	0	12	2	14.35	10	12	6	3	7	8	2
			21	93	7	5	15	1	11	2	13	8	14.35	10	13	10	3½	8	5	2½
			23	113	8	3	16	11	12	4	15	1	14.35	10	15	2	3½	9	3	2½
			25	135	9	0	18	6	13	6	16	6	14.35	10	16	6	4	10	0	3
			27	158	9	9	20	0	14	7	17	10	17.50	8	17	10	4	10	9	3
			29	181	10	5	21	5	15	7	19	1	17.50	8	19	2	4½	11	5	3¼
			31	203	11	0	22	8	16	6	20	3	20.74	6	20	6	4½	12	0	3¼
			31 2																	

¹ Mast lengths measured from heel to center of upper halyard sheave. Mast diameters measured at thwart. Mast and yard shall be of clear-grained spruce, fir, or equivalent.

² Subject to special consideration.

(t) *Matches*. A box of friction matches in a watertight container, stowed in an equipment locker or secured to the underside of the stern thwart if no locker is fitted, must be provided.

(u) *Mirrors, signaling*. Signaling mirrors must be of an approved type.

(v) *Oars*. A unit, consisting of a complement of rowing oars and steering oar, must be provided for each lifeboat in accordance with Table 169.529(v) except that motor-propelled and hand-propelled lifeboats need only be equipped with four rowing oars and one steering oar. In any case, the emergency lifeboats must be provided with the full complement of oars prescribed by the table. All oars must be buoyant.

TABLE 169.529(v)

Length of lifeboat (feet)		Number of oars—		Length of oars (feet)—	
Over—	Not over—	Rowing	Steer- ing	Rowing	Steer- ing
	15	4	1	8	9
15	19	6	1	10	11
19	21	6	1	11	12
21	23	6	1	12	13
23	25	8	1	13	14
25	27	8	1	14	15
27	.....	8	1	15	16

(w) *Oil, illuminating*. One quart of illuminating oil must be provided in a metal container if a lantern is carried.

(x) *Oil, storm*. One gallon of vegetable, fish, or animal oil must be provided in a suitable metal container so constructed as to permit a controlled distribution of oil on the water, and so arranged that it can be attached to the sea anchor.

(y) *Painter*. Painters must be of manila rope not less than 2¾ inches in circumference, or equivalent, and of a length not less than 3 times the distance between the deck on which the lifeboat is stowed and the light draft of the vessel. For lifeboats on vessels certificated for exposed or partially protected water service, one of the painters must have a long eye splice and be attached to the thwart with a toggle. The other painter must be attached to the stem.

(z) *Plug*. The automatic drain required in the lifeboat must be provided with a cap or plug attached to the lifeboat by a suitable chain.

(aa) *Provisions*. Approved emergency rations must be provided, consisting of 10,000 kJ (2390 calories) for each person the lifeboat is approved to carry. The provisions must be stowed in lockers or other compartments providing suitable protection.

(bb) *Rowlocks*. A unit, consisting of sufficient rowlocks and rowlock sockets for each oar required by Table 169.529(v) plus 2 additional rowlocks must be provided. The rowlocks must be attached to the lifeboat by separate chains so as to be available for immediate use, except that the 2 additional spare rowlocks must be carried in the equipment locker or stowed near the stern if no locker is fitted. The rowlocks and rowlock sockets must be distributed so as to provide the maximum amount of single banked oars practicable.

(cc) *Rudder and tiller*. The rudder and tiller must be constructed in accordance with § 160.035-3(t) of this chapter.

(dd) *Sea anchor*. The sea anchor must be of an approved type.

(ee) *Signals, distress, floating orange smoke*. The floating orange smoke distress signals must be approved under subpart 160.022 of this chapter. The signals must be replaced no later than the first annual stripping, cleaning, and overhaul of the lifeboat after the date of expiration.

(ff) *Signals, distress, red hand flare*. A unit consists of twelve hand red flare distress signals approved under subpart 160.021 or 160.023 of this chapter and stored in a watertight container. Signals must be replaced no later than the first annual stripping, cleaning, and overhaul of the lifeboat after the date of expiration.

(gg) *Signals, distress, red parachute flare*. A unit consists of twelve parachute red flare distress signals with an approved means of projection approved under subparts 160.024 and 160.028 respectively; or twelve approved hand-held rocket-propelled parachute red flare distress signals approved under subpart 160.036. Flares must be stored in a portable watertight container. Flares must be replaced no later than the first annual stripping, cleaning, and overhaul of the lifeboat after the date of expiration.

§ 169.531

(hh) *Tool kit*. The tool kit must consist of at least the following tools in a suitable container:

- (1) One 12-ounce ball peen hammer.
- (2) One screwdriver with 6-inch blade.
- (3) One pair 8-inch slip joint pliers.
- (4) One 8-inch adjustable end wrench.

(ii) *Water*. (1) For each person the lifeboat is certified to carry, there must be provided three quarts of drinking water in containers approved under subpart 160.026. Water must be replaced no later than the first annual stripping, cleaning, and overhaul of the lifeboat after date of expiration.

(2) One or more desalting kits, approved under subpart 160.058 of this chapter, may be used as a substitute for one-third of the drinking water required.

(3) The drinking water must be stowed in drinking water tanks, lockers, or other compartments providing suitable protection.

(jj) *Whistle, signaling*. The whistle must be of the ball-type or multi-tone type, of corrosion resistant construction, with a 36-inch lanyard attached, and in good working order.

(kk) *Fishing kit*. The fishing kit must be approved under subpart 160.061 of this chapter.

(ll) *Cover, protecting*. The cover must be of highly visible color and capable of protecting the occupants against exposure.

(mm) *Table of lifesaving signals*. The table of lifesaving signals must be in accordance with the provisions of Chapter V, Regulation 16, of the International Convention for Safety of Life at Sea, 1974, and must be printed on water resistant paper.

[CGD 83-005, 51 FR 896, Jan. 9, 1986, as amended by CGD 95-072, 60 FR 50468, Sept. 29, 1995]

§ 169.531 Required equipment for life-rafts.

Each liferaft must be fitted with the equipment required by and described in § 160.051-7(c) of Subchapter Q (Specifications) of this chapter.

§ 169.535 Required equipment for lifefloats.

Each lifefloat must be equipped in accordance with Table 169.535. The equipment is described in § 169.537.

46 CFR Ch. I (10-1-98 Edition)

TABLE 169.535

Letter identification and Item	Number required for each lifefloat	
	Exposed and partially protected water	Protected water
(a) Boathook	1	1
(b) Lifeline	1	1
(c) Paddles	4	4
(d) Painter	1	1
(e) Water light	1	None

§ 169.537 Description of equipment for lifefloats.

(a) *Boathook*. Each boathook must be of the single hook ball point type. Boathook handles must be of clear grained white ash, or equivalent, not less than 6 feet long and 1½ inches in diameter.

(b) *Lifeline and pendants*. The lifeline and pendants must be as furnished by the manufacturer with approved life floats. Replacement lifelines and pendants must meet the requirements in subpart 160.010 of this chapter.

(c) *Paddles*. Paddles must be not less than 5 feet long.

(d) *Painter*. The painter must—

(1) Be at least 30m (100 ft.) long, but not less than 3 times the distance between the deck on which the life float(s) are stowed and the light draft of the vessel,

(2) Have a breaking strength of at least 6.7 KN (1500 lbs.), except that if the capacity of the life float is 50 persons or more, the breaking strength must be at least 13.4 KN (3000 lbs.),

(3) Be of a dark color, if synthetic, or of a type certified to be resistant to deterioration from ultraviolet light, and

(4) Be stowed in such a way it runs freely when the life float floats away from the sinking vessel.

(e) *Water light*. The water light must be approved under subpart 161.010 of this chapter. The water light must be attached to the lifefloat by a 12-thread manila or equivalent synthetic lanyard 3 fathoms in length.

PERSONAL FLOTATION DEVICES

§ 169.539 Type required.

All personal flotation devices (PFDs) must be either—

(a) A Type I approved under subpart 160.055, 160.002, or 160.005 of Subchapter Q (specification) of this chapter; or

(b) a Type V approved specifically for sailing school vessel use under subpart 160.064 or 160.077 of Subchapter Q of this chapter; or

(c) a Type II approved under subparts 160.047, 160.052, or 160.060 or a Type III approved under subpart 160.064 if the vessel carries exposure suits or Type V exposure PFDs, in accordance with section 169.551.

§ 169.541 Number required.

Each vessel must be provided with an approved adult personal flotation device of an appropriate size for each person carried. In addition, unless the service is such that children are never carried, there must be provided an approved personal flotation device of a suitable size for each child carried.

§ 169.543 Distribution and stowage.

(a) Personal flotation devices must be distributed through the upper part of the vessel in protected places convenient to the persons on board.

(b) If practicable, personal flotation device containers must be designed to allow the PFDs to float free.

(c) Personal flotation devices for children, when provided, must be stowed separately.

(d) Lockers, boxes, and closets in which PFDs are stowed must not be capable of being locked.

§ 169.545 Markings.

(a) Each personal flotation device must be marked with the vessel's name.

(b) Where PFDs are stowed so that they are not readily visible to persons onboard, the containers in which they are stowed must be marked "adult personal flotation devices" or "child personal flotation devices", as appropriate, and with the number contained therein, in at least 1-inch letters and figures.

(c) Each personal flotation device carried on vessels certificated for exposed or partially protected waters service must have a light approved under subpart 161.012 of this chapter. The light must be securely attached to the front shoulder area of the personal flotation device.

(d) Each personal flotation device must have at least 200 sq. cm. (31 sq.

in.) of retroreflective material attached on its front side and at least 200 sq. cm. on its back side. If the personal flotation device is reversible, retroreflective material must be applied as described above on both sides.

(e) Retroreflective material required by this section must be Type I material that is approved under subpart 164.018 of this chapter.

ADDITIONAL LIFESAVING EQUIPMENT

§ 169.549 Ring lifebuoys and water lights.

(a)(1) The minimum number of life buoys and the minimum number to which water lights must be attached must be in accordance with the following table:

TABLE 169.549(A)(1)

Length of vessel	Minimum number of buoys	Minimum number of buoys with waterlights attached
Under 100	2	1
100 feet to less than 200 ft	4	2
200 feet to less than 300 ft	6	2
300 feet to less than 400 ft	12	4
400 feet to less than 600 ft	18	9

(2) One lifebuoy on each side of a vessel must have an attached line at least 15 fathoms in length.

(b) All lifebuoys must be placed where they are readily accessible. They must be capable of being readily cast loose.

(c)(1) All ring lifebuoys must be approved under subpart 160.050 or 160.064 of this chapter and be international orange in color.

(2) Each water light must be approved under subpart 161.010 of this chapter.

§ 169.551 Exposure suits.

(a) This section applies to each vessel operating in exposed or partially protected waters service except those—

(1) Operating on routes between 32° N and 32° S in the Atlantic Ocean.

(2) Operating on routes between 35° N and 35° S latitude in all other waters.

(b) Each vessel to which this section applies must have for each person on board an exposure suit approved under

§ 169.553

subpart 160.171 or a Type V exposure PFD approved under subpart 160.053.

[CGD 83-005, 51 FR 896, Jan. 9, 1986, as amended by CGD 95-072, 60 FR 50468, Sept. 29, 1995]

§ 169.553 Pyrotechnic distress signals.

(a) All pyrotechnic distress signals must be of an approved type.

(b) Replacement must be made no later than the first inspection for certification or reinspection after the date of expiration.

(c) Except as otherwise provided in this section, each vessel must carry the following pyrotechnic distress signals:

(1) 6 hand red flare distress signals, and 6 hand orange smoke distress signals; or,

(2) 12 hand held rocket propelled parachute red flare distress signals.

(d) [Reserved]

(e) All pyrotechnic distress signals must be carried near the helm or in a location considered suitable by the Officer in Charge, Marine Inspection.

(f) All pyrotechnic distress signals must be stowed in a portable watertight container.

§ 169.555 Emergency position indicating radio beacon (EPIRB).

(a) Each vessel certificated for exposed waters must have an approved Class A emergency position indicating radiobeacon (EPIRB), and each vessel certificated for partially protected waters must have an approved Class C emergency position indicating radiobeacon (EPIRB). The required EPIRB must be—

(1) Operational;

(2) Stowed where it is readily accessible for testing and use; and

(3) Stowed in a manner so that it will float free if the vessel sinks.

(b) Each vessel must have an additional Class B EPIRB for every twenty-five persons onboard, for use in the lifeboats and liferafts.

[CGD 83-005, 51 FR 896, Jan. 9, 1986; 51 FR 10632, Mar. 28, 1986]

§ 169.556 Work vests.

(a) Buoyant work vests carried under the permissive authority of this section must be approved under subpart 160.053 of this chapter.

46 CFR Ch. I (10-1-98 Edition)

(b) Approved buoyant work vests are items of safety apparel and may be carried aboard vessels to be worn by persons when working near or over the water under favorable working conditions. Work vests are not accepted in lieu of any of the required number of approved personal flotation devices and must not be worn during drills and emergencies.

(c) The approved buoyant work vests must be stowed separately from personal flotation devices, and in locations where they will not be confused with personal flotation devices.

(d) Each work vest is subject to examination by a marine inspector to determine its serviceability. If a work vest is found not to be in a serviceable condition, then it must be repaired or removed from the vessel. If a work vest is beyond repair, it must be destroyed in the presence of the marine inspector.

FIREFIGHTING EQUIPMENT

§ 169.559 Fire pumps.

(a) Each sailing school vessel must be equipped with fire pumps as required in Table 169.559(a).

TABLE 169.559(A)—FIRE PUMPS

Length	Exposed and partially protected water service	Protected water service
65 feet but less than 90 feet	1 ¹	0
90 feet but less than 120 feet	2 ¹	1 ¹
120 feet or greater	3 ²	1 ¹

¹ May be driven off a propulsion engine and may be used as a bilge pump.

² Must be driven by a source of power independent of the propulsion engine and may be used as a bilge pump.

³ One pump may be driven off a propulsion unit and one pump may be used as a bilge pump. Pumps must be located in separate spaces.

(b) Fire pump capacity must be in accordance with the following:

Vessel length	Minimum capacity
Less than 90 ft	5.5 m ³ /hr (25 gpm).
90 feet but less than 120 ft	11.0 m ³ /hr (50 gpm).
Greater than 120 ft	14.3 m ³ /hr (66.6 gpm).

(c) Each fire pump must be fitted with a pressure gage on the discharge side of the pump.

(d) Each vessel must have a hand operated portable fire pump having a capacity of at least 1.1 m³/hr (5 gpm).

This pump must be equipped with suction and discharge hose suitable for use in firefighting.

§ 169.561 Firemain.

(a) Each vessel required to be provided with a power-driven fire pump must also be provided with a fire main, hydrants, hoses and nozzles.

(b) Fire hydrants must be of sufficient number and located so that any part of the vessel may be reached with an effective stream of water from a single length of hose.

(c) All piping, valves, and fittings must be in accordance with good marine practice and suitable for the purpose intended.

§ 169.563 Firehose.

(a) One length of firehose must be provided for each fire hydrant required.

(b) Vessels less than 90 feet in length must have commercial firehose or equivalent of not over 1½ inch diameter or garden hose of not less than ¾ inch nominal inside diameter. If garden hose is used, it must be of a good commercial grade constructed of an inner rubber tube, plies of braided cotton reinforcement and an outer rubber cover, or of equivalent material, and must be fitted with a commercial garden hose nozzle of good grade bronze or equivalent metal.

(c) Vessels of 90 feet or greater must have lined commercial firehose that conform to Underwriters' Laboratories, Inc. Standard 19 or Federal Specification ZZ-H-451. The firehose must be fitted with a combination nozzle approved under § 162.027 of this chapter.

(d) Each length of firehose must be a single piece 50 feet long.

(e) Firehose must be connected to the hydrants at all times, except that, on open decks where no protection is afforded to the hose, it may be temporarily removed from the hydrant in heavy weather and stowed in an accessible nearby location.

§ 169.564 Fixed extinguishing system, general.

(a) Fixed carbon dioxide or halogenated extinguishing systems must be installed to protect the following spaces—

(1) The machinery and fuel tank spaces of all vessels, except where machinery and fuel tank spaces are so open to the atmosphere as to make the use of a fixed system ineffective;

(2) The paint and oil rooms and similar hazardous spaces; and

(3) The galley stove area, for vessels greater than 90 feet in length and certificated for exposed or partially protected water service.

(b) Each fixed extinguishing system must be of an approved carbon dioxide or halogenated type and installed to the satisfaction of the Officer in Charge, Marine Inspection.

§ 169.565 Fixed carbon dioxide system.

(a) The number of pounds of carbon dioxide required for each space protected must be equal to the gross volume of the space divided by the appropriate factor in Table 169.565(a).

TABLE 169.565(A)

Gross volume of compartment, cubic feet		Factor
Over—	Not over—	
0	500	15
500	1,600	16
1,600	4,500	18
4,500 .....	.....	20

(b) A separate supply of carbon dioxide is not required for each space protected. The total available supply must be sufficient for the space requiring the greatest amount.

(c) *Controls.* (1) Each control and valve for the operation of the system must be outside the spaces protected and accessible at all times.

(2) Each branch line must be fitted with an approved shutoff valve. Each valve must be kept closed at all times except to operate the particular system.

(3) The arrangements must be such that the entire charge to any space can be introduced into the space by the operation of one valve selecting the space, and one control for releasing the required amount of fire extinguishing agent. The release control must be of an approved type and located adjacent to the branch line shutoff valve.

(4) Complete but simple instructions for the operation of the system must be located in a conspicuous place at or near the releasing control device.

(5) Each control valve to branch lines must be labeled to indicate the space served.

(d) *Piping.* (1) The pipe and fittings for the extinguishing systems must be in accordance with the system manufacturer's approved design manual.

(2) Each pipe, valve, and fitting of ferrous materials must be galvanized.

(3) Each dead-end line must extend at least 2 inches beyond the last orifice and must be closed with cap or plug.

(4) Each pipe, valve, and fitting must be securely supported and, where necessary, protected against injury.

(5) Drains and dirt traps must be fitted where necessary to prevent accumulation of dirt or moisture. Each drain and dirt trap must be located in accessible locations but not in accommodation spaces.

(e) *Discharge outlets.* (1) The area of discharge outlets shall be as specified in the manufacturer's approved design manual.

(2) The discharge of the required amount of carbon dioxide must be complete within two minutes.

(f) *Cylinders.* (1) Each cylinder must be securely fastened and supported, and where necessary protected against injury. Cylinders must be located outside the space protected.

(2) Each cylinder must be mounted in an upright position or inclined not more than 30° from the vertical, except that cylinders which are fitted with

flexible or bent siphon tubes may be inclined not more than 80° from the vertical.

(3) Each cylinder used for storing extinguishing agent must be approved and marked in accordance with Department of Transportation regulations.

(4) Each cylinder must be mounted so it is readily accessible and capable of easy removal for recharging and inspection. Cylinders must be capable of being weighed in place.

(5) Where subject to moisture, cylinders must be installed so that a space of at least 2 inches is provided between the flooring and the bottom of the cylinders.

(6) Each cylinder storage area must be properly ventilated and the temperature inside must not exceed 130 ° F.

(g) Provision must be made by means of plugs, covers, dampers, etc., to prevent the admission of air into the space protected.

(h) Systems must be fitted with a delayed discharge and an alarm bell arranged so the alarm sounds for at least twenty seconds before the carbon dioxide is released into the space.

§ 169.567 Portable extinguishers.

(a) The minimum number of portable fire extinguishers required on each vessel is determined by the Officer in Charge, Marine Inspection, in accordance with Table 169.567(a) and other provisions of this subpart.

TABLE 169.567(A)

Space protected	Total number extinguishers required	Type extinguishers permitted		Coast Guard classification
		Medium	Minimum size	
Living space and open boats.	1 per 1000 cu. ft. of space.	Halon 1211 of 1301	2½ pounds	B-I.
		Foam	1¼ gallons	
		Carbon dioxide	4 pounds	
		Dry chemical	2 pounds	
Propulsion machinery space with fixed CO ₂ or halon system.	1	Foam	1¼ gallons	
	Carbon dioxide. 4 pounds			
	B-I..			
Propulsion machinery space without fixed CO ₂ or halon system.	2	Dry chemical	2 pounds	
		Halon 1211 or 1301	2½ pounds	
		Foam	2½ gallons	
	Carbon dioxide. 15 pounds			
	B-II..			

TABLE 169.567(A)—Continued

Space protected	Total number extinguishers required	Type extinguishers permitted		Coast Guard classification
		Medium	Minimum size	
Galley (without fixed system).	1 per 500 cu. ft	Dry chemical	10 pounds	B-II.
		Halon 1211 or 1301	10 pounds	
		Foam	2½ gallons	
		Carbon dioxide	15 pounds	
		Dry chemical	10 pounds	
		Halon 1211 or 1301	10 pounds	

(b) The Officer in Charge, Marine Inspection, may permit the use of any approved fire extinguishers, including semiportable extinguishers, which provide equivalent fire protection.

(c) All portable fire extinguishers installed on vessels must be of an approved type.

(d) Portable fire extinguishers must be stowed in a location convenient to the space protected.

(e) Portable fire extinguishers must be installed and located to the satisfaction of the Officer in Charge, Marine Inspection.

(f) Portable fire extinguishers which are required to be protected from freezing must not be located where freezing temperatures may be expected.

(g) Each vessel must carry spare charges for at least 50 percent of each size and variety of hand portable extinguishers required. For units that can not be readily recharged on the vessel, one spare extinguisher for each classification carried onboard must be provided in lieu of spare charges.

[CGD 83-005, 51 FR 897, Jan. 9, 1986; 51 FR 3785, Jan. 30, 1986]

§ 169.569 Fire axes.

(a) Each vessel must carry at least the number of fire axes set forth in Table 169.569(a). The Officer in Charge, Marine Inspection may require additional fire axes necessary for the proper protection of the vessel.

TABLE 169.569(A)

Length		Number of axes
Over	Not over	
	65	0
65	90	1
90	120	2
120	150	3

TABLE 169.569(A)—Continued

Length		Number of axes
Over	Not over	
150	4

(b) Fire axes must be stowed so as to be readily available in the event of emergency.

(c) If fire axes are not located in the open or behind glass, they must be placed in marked enclosures containing the fire hose.

Subpart 169.600 Machinery and Electrical

§ 169.601 General.

(a) The regulations in this subpart contain requirements for the design, construction and installation of machinery on sailing school vessels.

(b) Machinery must be suitable in type and design for the purpose intended. Installations of an unusual type and those not addressed by this subpart are subject to the applicable regulations in Subchapter F (Marine Engineering) and Subchapter J (Electrical Engineering) of this chapter.

(c) The use of liquefied inflammable gases, such as propane, methane, butane, etc., as fuel, except for cooking purposes, is prohibited.

INTERNAL COMBUSTION ENGINE INSTALLATIONS

§ 169.605 General.

(a) Generators, starting motors, and other spark producing devices must be mounted as high above the bilges as practicable.

(b) Gages to indicate engine cooling water temperature, exhaust cooling

water temperature and engine lubricating oil pressure must be provided and located in plain view.

(c) All electrical components of the engine must be protected in accordance with § 183.410 of Title 33, Code of Federal Regulations to prevent ignition of flammable vapors.

§ 169.607 Keel cooler installations.

(a) Except as provided in this section, keel cooler installations must meet the requirements of § 56.50–96 of this chapter.

(b) Approved metallic flexible connections may be located below the deepest load waterline if the system is a closed loop below the waterline and its vent is located above the waterline.

(c) Fillet welds may be used in the attachment of channels and half round pipe sections to the bottom of the vessel.

(d) Short lengths of approved non-metallic flexible hose may be used at machinery connections fixed by hose clamps provided that—

(1) The clamps are of a corrosion resistant material;

(2) The clamps do not depend on spring tension for their holding power; and

(3) Two clamps are used on each end of the hose or one hose clamp is used and the pipe ends are expanded or beaded to provide a positive stop against hose slippage.

§ 169.608 Grid cooler installations

(a) Hull penetrations for grid cooler installations must be made through a cofferdam or at a sea chest.

(b) Grid coolers must be suitably protected against damage from debris and grounding by recessing the unit into the hull or by the placement of protective guards.

(c) Each grid cooler hull penetration must be equipped with a shutoff valve.

§ 169.609 Exhaust systems.

Engine exhaust installations and associated cooling systems must be built in accordance with the requirements of American Boat and Yacht Council, Inc. Standard P-1, "Safe Installation of Exhaust Systems for Propulsion and Auxiliary Machinery" and the following additional requirements:

(a) All exhaust installations with pressures in excess of 15 pounds per square inch gage or employing runs passing through living or working spaces must meet the material specifications of part 56 of Title 46, Code of Federal Regulations.

(b) Horizontal dry exhaust pipes are permitted if they do not pass through living or berthing spaces, terminate above the deepest load waterline, are arranged to prevent entry of cold water from rough seas, and are constructed of corrosion resistant material at the hull penetration.

(c) When the exhaust cooling system is separate from the engine cooling system, a suitable warning device must be provided to indicate a failure of water flow in the exhaust cooling system.

§ 169.611 Carburetors.

(a) This section applies to all vessels having gasoline engines.

(b) Each carburetor other than a down-draft type, must be equipped with integral or externally fitted drip collectors of adequate capacity and arranged so as to permit ready removal of fuel leakage. Externally fitted drip collectors must be covered with flame screens.

(c) All gasoline engines must be equipped with an acceptable means of backfire flame control. Installations of backfire flame arresters bearing basic Approval Nos. 162.015 or 162.041 or engine air and fuel induction systems bearing basic Approval Nos. 162.015 or 165.042 may be continued in use as long as they are serviceable and in good condition. New installations or replacements must meet the applicable requirements of part 58, subpart 58.10 (Internal Combustion Engine Installations) of this chapter.

[CGD 83-005, 51 FR 896, Jan. 9, 1986, as amended by CGD 88-032, 56 FR 35827, July 29, 1991]

FUEL SYSTEMS

§ 169.613 Gasoline fuel systems.

(a) Except as provided in paragraph (b) each gasoline fuel system must meet the requirements of § 56.50–70 of this chapter

(b) Each vessel of 65 feet and under must meet the requirements of

§§ 182.15–25, 182.15–30, 182.15–35 and 182.15–40 of this chapter.

§ 169.615 Diesel fuel systems.

(a) Except as provided in paragraph (b) each diesel fuel system must meet the requirements of § 56.50–75 of this chapter.

(b) Each vessel of 65 feet and under must meet the requirements of §§ 182.20–22, 182.20–25, 182.20–30, 182.20–35 and 182.20–40 of this chapter.

STEERING SYSTEMS

§ 169.618 General.

(a) Each vessel must have an effective steering system.

(b) The steering system must be designed to withstand all anticipated loading while under sail, including shocks to the rudder. Additionally, the steering system on vessels with an auxiliary means of propulsion must not be susceptible to damage or jamming at the vessel's maximum astern speed.

(c) The main steering gear must be capable of moving the rudder from hard-over to hard-over at an average rate of not less than $2\frac{1}{3}^{\circ}$ per second with the vessel at design service speed (ahead).

§ 169.619 Reliability.

(a) Except where the OCMI judges it impracticable, the steering system must—

(1) Provide continued or restored steering capability in the event of a failure or malfunction of any single steering system component other than the rudder or rudder stock;

(2) Be independent of other systems, including auxiliary propulsion machinery; and

(3) Be operable in the event of localized fire or flooding.

(b) A main and independent auxiliary steering gear must be provided, except when—

(1) A small vessel uses a tiller or direct mechanical linkage as the primary means of controlling the rudder; or

(2) Installation of an auxiliary steering gear is not possible.

NOTE: A partial reduction of normal steering capability as a result of malfunction or failure is acceptable. This reduction should

not be below that necessary for the safe navigation of the vessel.

(c) The strength and reliability of any component that is not provided in duplicate must be suitable to the cognizant OCMI. Where redundant or backup equipment or components are provided to meet the requirements of paragraphs (a) and (b) of this section, the following must be provided:

(1) A means to readily transfer from the failed equipment or component to the backup.

(2) Readily available tools or equipment necessary to make the transfer.

(3) Instructions for transfer procedures, posted at the main steering location.

(4) A means to steady the rudder while making the transfer.

§ 169.621 Communications.

A reliable means of voice communications must be provided between the main steering location and each alternate steering location.

§ 169.622 Rudder angle indicators.

Each vessel must have a rudder angle indicator at the main steering location that meets the requirements of § 113.40–10 of this chapter, except where a tiller or direct mechanical linkage is the primary means of controlling the rudder.

§ 169.623 Power-driven steering systems.

(a) Power-driven steering systems must have means to be brought into operation from a dead ship condition, without external aid. The system must automatically resume operation after an electric power outage.

(b) Control of power-driven steering systems from the main steering control location must include, as applicable—

(1) Control of any necessary ancillary device (motor, pump, valve, etc.);

(2) A pilot light to indicate operation of each power unit; and

(3) Visual and audible alarms to indicate loss of power to the control system or power units and overload of electric motors.

(c) Overcurrent protection for steering system electric circuits must meet § 111.93–11 of this chapter, as applicable.

VENTILATION

§ 169.625 Compartments containing diesel machinery.

(a) Spaces containing machinery must be fitted with adequate dripproof ventilators, trunks, louvers, etc., to provide sufficient air for proper operation of the propulsion and auxiliary engines.

(b) Air-cooled propulsion and auxiliary engines installed below deck must be fitted with air intake ducts or piping from the weather deck. The ducts or piping must be arranged and supported to safely sustain stresses induced by weight and engine vibration and to minimize transfer of vibration to the supporting structure. Prior to installing ventilation for the engines, plans or sketches showing the machinery arrangement including air intakes, exhaust stack, method of attachment of ventilation ducts to the engine, location of spark arresting mufflers and capacity of ventilation blowers must be submitted to the OCM for approval.

(c) Spaces containing machinery must be fitted with at least two ducts to furnish natural or mechanical supply and exhaust ventilation. One duct must extend to a point near the bottom of the compartment, and be installed so that the ordinary collection of water in the bilge will not trap the duct. Where forced ventilation is installed, the duct extending to the bottom of the compartment must be the exhaust. The total inlet area and the total outlet area of ventilation ducts must be not less than one square inch for each foot of beam of the vessel. These minimum areas must be increased when such ducts are considered part of the air supply to the engines.

(d) All ducts must be of rigid permanent noncombustible construction, properly fastened, supported, and reasonably gastight from end to end.

(e) All supply ducts for ventilation purposes must be provided with cowls or scoops having a free area not less than twice the required duct area. When the cowls or scoops are screened, the mouth area must be increased to compensate for the area of the screen wire. Dampers are prohibited in supply ducts. Cowls or scoops must be kept open at all times except when weather

would endanger the vessel if the openings were not temporarily closed. Supply and exhaust openings must not be located where the natural flow of air is unduly obstructed, or adjacent to possible sources of vapor ignition, and must not be located where exhaust air may be taken into the supply vents.

§ 169.627 Compartments containing diesel fuel tanks.

Unless they are adequately ventilated, enclosed compartments or spaces containing diesel fuel tanks and no machinery must be provided with a goose-neck vent of not less than 2½ inches in diameter. The vent opening must not be located adjacent to possible sources of vapor ignition.

§ 169.629 Compartments containing gasoline machinery or fuel tanks.

Spaces containing gasoline machinery or fuel tanks must have natural supply and mechanical exhaust ventilation meeting the requirements of American Boat and Yacht Council Standard H-2.5, "Design and Construction; Ventilation of Boats Using Gasoline."

§ 169.631 Separation of machinery and fuel tank spaces from accommodation spaces.

(a) Machinery and fuel tank spaces must be separated from accommodation spaces by watertight or vapor tight bulkheads of double diagonal wood, marine plywood, steel plate, or equivalent construction.

(b) On vessels less than 90 feet in length, segregation may be by means of a watertight or vapor tight engine box.

PIPING SYSTEMS

§ 169.640 General.

(a) Vital piping systems, as defined in § 169.642 of this subpart, must meet the material and pressure design requirements of Subchapter F of this chapter.

(b) Except as provided in this paragraph, nonmetallic piping system materials must meet the applicable requirements of 46 CFR 56.60–25.

(1) Rigid nonmetallic materials are acceptable for use in bilge, ballast, and machinery-connected piping systems on vessels less than 120 feet in length,

provided that bilge and fire systems do not use the same piping.

(2) Nonmetallic piping is prohibited in fuel systems except where flexible hose is permitted.

(3) Rigid nonmetallic materials may be used in non-vital systems.

§ 169.642 Vital systems.

For the purpose of this part, the following are considered vital systems—

(a) A marine engineering system identified by the OCMI as being crucial to the survival of the vessel or to the protection of the personnel on board; and

(b) On vessels greater than 120 feet in length—

- (1) Bilge system;
- (2) Ballast system;
- (3) Fire protection system;
- (4) Fuel oil system; and
- (5) Steering and steering control system.

BILGE SYSTEMS

§ 169.650 General.

All vessels must be provided with a satisfactory arrangement for draining any compartment, other than small buoyancy compartments, under all practical conditions. Sluice valves are not permitted in watertight bulkheads except as specified in § 169.652(a).

§ 169.652 Bilge piping.

(a) All vessels of 26 feet in length and over must be provided with individual bilge lines and suction for each compartment except that the space forward of the collision bulkhead may be serviced by a sluice valve or portable bilge pump if the arrangement of the vessel is such that ordinary leakage can be removed this way.

(b) The bilge pipe on vessels 65 feet in length and under must be not less than one inch nominal pipe size. On vessels greater than 65 but less than 120 feet in length the bilge pipe must be not less than one and one-half inches. Piping on vessels of 120 feet or greater or of 100 gross tons or greater must meet the requirements contained in § 56.50-50 of this chapter.

(c) Each bilge suction must be fitted with a suitable strainer having an open

area not less than three times the area of the bilge pipe.

(d) Each individual bilge suction line must be led to a central control point or manifold. Each line must be provided with a stop valve at the control point or manifold and a check valve at some accessible point in the bilge line, or a stop-check valve located at the control point or manifold.

(e) Each bilge pipe piercing the collision bulkhead must be fitted with a screw-down valve located on the forward side of the collision bulkhead and operable from above the weather deck.

§ 169.654 Bilge pumps.

(a) Vessels of less than 65 feet in length must have a portable hand bilge pump having a maximum capacity of 5 gpm.

(b) In addition to the requirements of paragraph (a) of this section, vessels of 26 feet but less than 40 feet in length must have a fixed hand bilge pump or fixed power bilge pump having a minimum capacity of 10 gpm. If a fixed hand pump is installed, it must be operable from on deck.

(c) In addition to the requirements of paragraph (a) of this section, vessels of 40 feet but less than 65 feet must have a fixed power bilge pump having a minimum capacity of 25 gpm.

(d) Vessels of 65 feet in length but less than 120 feet and under 100 gross tons must have two fixed power bilge pumps having a combined minimum capacity of 50 gpm.

(e) Vessels of 120 feet or greater and vessels of 100 gross tons and over must have two fixed power pumps meeting the capacity requirements of § 56.50-55(c) of this chapter.

(f) Each power driven bilge must be self priming.

(g) Each fixed bilge pump required by this section must be permanently connected to the bilge main.

(h) Bilge pumps may also be connected to the firemain provided that the bilge system and firemain system may be operated simultaneously.

ELECTRICAL

§ 169.662 Hazardous locations.

Electrical equipment must not be installed in lockers that are used to store

paint, oil, turpentine, or other flammable liquids unless the equipment is explosion-proof or intrinsically safe in accordance with § 111.105–9 or § 111.105–11 of this chapter.

ELECTRICAL INSTALLATIONS OPERATING AT POTENTIALS OF LESS THAN 50 VOLTS ON VESSELS OF LESS THAN 100 GROSS TONS

§ 169.664 Applicability.

The requirements in this subpart apply to electrical installations operating at potentials of less than 50 volts on vessels of less than 100 gross tons.

§ 169.665 Name plates.

Each generator, motor and other major item of power equipment must be provided with a name plate indicating the manufacturer's name, its rating in volts and amperes or in volts and watts and, when intended for connection to a normally grounded supply, the grounding polarity.

§ 169.666 Generators and motors.

(a) Each vessel of more than 65 feet in length having only electrically driven fire and bilge pumps must have two generators. One of these generators must be driven by a means independent of the auxiliary propulsion plant. A generator that is not independent of the auxiliary propulsion plant must meet the requirements of § 111.10–4(c) of this chapter.

(b) Each generator and motor must be in a location that is accessible, adequately ventilated, and as dry as practicable.

(c) Each generator and motor must be mounted as high as practicable above the bilges to avoid damage by splash and to avoid contact with low lying vapors.

(d) Each generator must be protected from overcurrent by a circuit breaker, fuse or an overcurrent relay.

§ 169.667 Switchboards.

(a) Each switchboard must be in as dry a location as practicable, accessible, protected from inadvertent entry, and adequately ventilated. All uninsulated current carrying parts must be mounted on nonabsorbent, noncombustible, high dielectric insulating material.

(b) Each switchboard must be—

- (1) Totally enclosed; and
- (2) Of the dead front type.

(c) Each ungrounded conductor of a circuit must have at the point of attachment to the power source either—

- (1) A Circuit breaker; or
- (2) A switch and fuse.

(d) Each switch other than one mounted on a switchboard must be of the enclosed type.

§ 169.668 Batteries.

(a) Each battery must be in a location that allows the gas generated in charging to be easily dissipated by natural or induced ventilation.

(b) Except as provided in paragraph (c) of this section, a battery must not be located in the same compartment with a gasoline tank or gasoline engine.

(c) If compliance with paragraph (b) of this section is not practicable, the battery must be effectively screened by a cage or similar structure to minimize the danger of accidental spark through dropping a metal object across the terminals.

(d) Each battery must be located as high above the bilges as practicable and secured against shifting with motion of the vessel. Each battery and battery connection must be accessible so as to permit removal.

(e) All connections must be made to battery terminals with permanent type connectors. Spring clips or other temporary type clamps may not be used.

(f) Each battery must be located in a tray of lead or other suitable material resistant to deteriorating action by the electrolyte.

(g) Each battery charger intended for connection to a commercial supply voltage must employ a transformer of the isolating type. An ammeter that is readily visible must be included in the battery charger circuit.

(h) A voltage dropping resistor, provided for charging a battery, must be mounted in a ventilated noncombustible enclosure that prevents hazardous temperatures at adjacent combustible materials.

(i) The main supply conductor from the battery must have an emergency switch, located as close as practicable

to the battery, that opens all ungrounded conductors.

(j) If a storage battery is not in the same compartment and adjacent to the panel or box that distributes power to the various lighting, motor and appliance branch circuits, the storage battery lead must be fused at the battery.

§ 169.669 Radiotelephone equipment.

A separate circuit from the switchboard must be provided for each radiotelephone installation.

§ 169.670 Circuit breakers.

Each circuit breaker must be of the manually reset type designed for—

- (a) Inverse time delay;
- (b) Instantaneous short circuit protection; and
- (c) Repeated opening of the circuit without damage to the circuit breaker.

§ 169.671 Accessories.

Each light, receptacle and switch exposed to the weather must be watertight and must be constructed of corrosion-resistant material.

§ 169.672 Wiring for power and lighting circuits.

(a) Wiring for power and lighting circuits must have copper conductors, of 14 AWG or larger, and—

- (1) Meet Article 310-8 and Table 310-13 of the National Electrical Code;
- (2) Be listed as "50 volt boat cable"; or
- (3) Meet subpart 111.60 of this chapter.

(b) Wiring for power and lighting circuits on new vessels must have stranded conductors.

(c) Conductors must be sized so that—

- (1) They are adequate for the loads carried; and
- (2) The voltage drop at the load terminals is not more than 10 percent.

§ 169.673 Installation of wiring for power and lighting circuits.

(a) Wiring must be run as high as practicable above the bilges.

(b) Wiring, where subject to mechanical damage, must be protected.

(c) A wiring joint or splice must be mechanically secure and made in a junction box or enclosure.

(d) Unless a splice is made by an insulated pressure wire connector, it must be thoroughly soldered and taped with electrical insulating tape or the soldered joint must be otherwise protected to provide insulation equivalent to that of the conductors joined.

(e) Where ends of stranded conductors are to be clamped under terminal screws, they must be formed and soldered unless fitted with pressure terminal connectors.

(f) Conductors must be protected from overcurrent in accordance with their current-carrying capacities.

(g) Conductors supplying motors and motor operated appliances must be protected by a separate overcurrent device that is responsive to motor current. This device must be rated or set at not more than 125 percent of the motor full-load current rating.

(h) On metallic vessels the enclosures and frames of all major electrical equipment must be permanently grounded to the metal hull of the vessel by the mounting bolts or other means. Cable armor must not be used as the normal grounding means.

(i) On nonmetallic vessels, the enclosures and frames of major electrical equipment must be bonded together to a common ground by a normally non-current carrying conductor.

(j) For grounded systems the negative polarity of the supply source must be grounded to the metal hull or, for nonmetallic vessels, connected to the common ground.

(k) On a nonmetallic vessel, where a ground plate is provided for radio equipment it must be connected to the common ground.

(l) For grounded systems, hull return must not be used except for engine starting purposes.

ELECTRICAL INSTALLATIONS OPERATING AT POTENTIALS OF 50 Volts or MORE ON VESSELS OF LESS THAN 100 GROSS TONS

§ 169.674 Applicability.

The requirements in this subpart apply to electrical installations operating at potentials of 50 volts or more, on vessels of less than 100 gross tons.

§ 169.675 Generators and motors.

(a) Each generator and motor must be fitted with a nameplate of corrosion-resistant material marked with the following information as applicable:

- (1) Name of manufacturer.
- (2) Manufacturer's type and frame designation.
- (3) Output in kilowatts or horsepower rating.
- (4) Kind of rating (continuous, intermittent, etc.).
- (5) Revolutions per minute at rated load.
- (6) Amperes at rated load.
- (7) Voltage.
- (8) Frequency if applicable.
- (9) Number of phases, if applicable.
- (10) Type of winding (for direct-current motors).

(b) Each vessel of more than 65 feet in length having only electrically driven fire and bilge pumps must have two generators. One of these generators must be driven by a means independent of the auxiliary propulsion plant. A generator that is not independent of the auxiliary propulsion plant must meet the requirements of § 111.10–4(c) of this chapter.

(c) Each generator and motor must be in a location that is accessible, adequately ventilated, and as dry as practicable.

(d) Each generator and motor must be mounted as high as practicable above the bilges to avoid damage by splash and to avoid contact with low lying vapors.

(e) Each motor for use in a location exposed to the weather must be of the watertight or waterproof type or must be enclosed in a watertight housing. The motor enclosure or housing must be provided with a check valve for drainage or a tapped hole at the lowest part of the frame for attaching a drain pipe or drain plug.

(f) Except as provided in paragraphs (g) and (h) of this section, each generator and motor for use in a machinery space must be designed for an ambient temperature of 50 degrees C. (122 degrees F.).

(g) A generator or motor may be designed for an ambient temperature of 40 degrees C. (104 degrees F.) if the vessel is designed so that the ambient

temperature in the machinery space will not exceed 40 degrees C. under normal operating conditions.

(h) A generator or motor designed for 40 degrees C. may be used in a 50 degrees C. ambient location provided it is derated to 80 percent of full load rating, and the rating or setting of the overcurrent device is reduced accordingly. A nameplate specifying the derated capacity must be provided for each motor and generator.

(i) A voltmeter and an ammeter must be provided that can be used for measuring voltage and current of each generator that is in operation. For each alternating-current generator a means for measuring frequency must also be provided. Additional control equipment and measuring instruments must be provided, if needed, to ensure satisfactory operation of each generator.

§ 169.676 Grounded electrical systems.

(a) Except as provided in paragraph (b) of this section, each electrical system must meet subpart 111.05 of this chapter.

(b) Ground detection is not required.

§ 169.677 Equipment protection and enclosure.

(a) Except as provided in this section, all electrical equipment including motors, generators, controllers, distribution panels, consoles, etc., must be at least dripproof and protected.

(b) Equipment mounted on a hinged door of an enclosure must be constructed or shielded so that no live parts of the door mounted equipment will be exposed to accidental contact by a person with the door open and the circuit energized.

(c) Any cabinet, panel, or box containing more than one source of potential in excess of 50 volts must be fitted with a sign warning personnel of this condition and identifying the circuits to be disconnected to remove all the potentials in excess of 50 volts.

(d) Each distribution panelboard must be enclosed.

§ 169.678 Main distribution panels and switchboards.

(a) A distribution panel to which the generator leads are connected, and

from which the electric leads throughout the vessel directly or indirectly receive their electric power is a switchboard.

(b) Each switchboard must have a driphood or an equivalent means of protecting against falling liquid.

(c) Nonconductive deck materials, mats, or gratings must be provided in front of each switchboard.

(d) If the switchboard is accessible from the rear, nonconductive deck material, mats, or gratings must be provided in the rear of the switchboard.

(e) Metal cases of instruments and secondary windings of instrument transformers must be grounded.

(f) Each switchboard must be placed in a location that is accessible, adequately ventilated, and as dry as practicable. All uninsulated current carrying parts must be mounted on non-absorbent, noncombustible, high dielectric insulating material.

(g) Each switchboard must be of the dead front type.

(h) Each switchboard must have front and, if accessible from the back, rear non-conducting hand rails except on vessels where the surrounding bulkheads and decks are of an insulating material such as fiberglass or wood.

§ 169.679 Wiring for power and lighting circuits.

Wiring for each power and lighting circuit must meet subpart 111.60 of this chapter.

§ 169.680 Installation of wiring for power and lighting circuits.

(a) Wiring must be run as high as practicable above the bilges.

(b) Each cable installed where particularly susceptible to damage such as locations in way of doors, hatches, etc., must be protected by removable metal coverings, angle irons, pipe, or other equivalent means. All metallic coverings must be electrically continuous and grounded to the metal hull or common ground, and all coverings such as pipe that may trap moisture must be provided with holes for drainage. Where cable protection is carried through a watertight deck or bulkhead, the installation must maintain the watertight integrity of the structure.

(c) Each cable entering a box or fitting must be protected from abrasion, and must meet the following requirements:

(1) Each opening through which conductors enter must be adequately closed.

(2) Cable armor must be secured to the box or fitting.

(3) In damp or wet locations, each cable entrance must be watertight.

(d) The enclosures of all equipment must be permanently grounded to the metal hull of the vessel by the mounting bolts or other means. Cable armor must not be used as the normal grounding means.

(e) On a nonmetallic vessel, the enclosures must be bonded to a common ground by a normal noncurrent carrying conductor.

(f) On a nonmetallic vessel, where a ground plate is provided for radio equipment it must be connected to the common ground.

(g) Except as provided in paragraph (i) of this section, each armored cable must have a metallic covering that is—

(1) Electrically and mechanically continuous; and

(2) Grounded at each end of the run to—

(i) The metal hull; or

(ii) The common ground required by paragraph (e) of this section on non-metallic vessels.

(h) In lieu of being grounded at each end of the run as required by paragraph (g) of this section, final sub-circuits may be grounded at the supply end only.

(i) All equipment, including switches, fuses, lampholders, etc., must be of a type designed for the proper potential and be so identified.

(j) Except as provided in paragraph (l) of this section, each junction box, connection box, and outlet box, must have an internal depth of at least 1½ inches.

(k) For a box incorporated in a fixture having a volume of not less than 20 cubic inches, the depth may be decreased to not less than 1 inch.

(l) Each conductor, except a fixture wire within a box, must have a free space computed using the volume per conductor given in Table 169.680(l). If a fitting or device such as a cable clamp,

§ 169.681

hickey, switch or receptacle is contained in the box, each fitting or device must count as one conductor.

TABLE 169.680(L)

Size of conductor A.W.G.	Free space for each conductor in box, cubic inches
14	2.0
12	2.25
8	2.50
1	3.0

(m) Each junction box, connection box, and outlet box for use in a damp or wet location must be of watertight construction.

(n) Each lighting fixture must be constructed in accordance with the requirements of Subchapter J of this chapter.

(o) A separate circuit from the switchboard must be provided for each radiotelephone installation.

(p) Knife switches must be so placed or designed that gravity or vibration will not tend to close them. Knife switches, unless of the double throw type, must be connected so that the blades are dead when the switch is in the open position.

(q) Circuits must be connected to the fuse end of switches and to the coil end of circuit breakers, except that generator leads or incoming feeders may be connected to either end of circuit breakers.

(r) Receptacle outlets and attachment plugs for the attachment of portable lamps, tools, and similar apparatus supplied as ship's equipment and operating at 100 volts or more, must provide a grounding pole and a grounding conductor in the portable cord to ground the non-current carrying metal parts of the apparatus.

(s) Receptacle outlets of the type providing a grounded pole must be of a configuration that will not permit the dead metal parts of portable apparatus to be connected to a live conductor.

§ 169.681 Disconnect switches and devices.

(a) Externally operable switches or circuit breakers must be provided for motor and controller circuits and must open all ungrounded conductors of the circuit.

(b) If the disconnect means is not within sight of the equipment that the

46 CFR Ch. I (10–1–98 Edition)

circuit supplies, means must be provided for locking the disconnect device in the "open" position.

(c) For circuits protected by fuses, the disconnect switch required for fuses in § 169.683(b) of this chapter is adequate for disconnecting the circuit from the supply.

(d) The disconnect means may be in the same enclosure with motor controllers.

(e) Disconnect means must be provided to open all conductors of generator and shore power cables.

[CGD 83–005, 51 FR 896, Jan. 9, 1986; 51 FR 10632, Mar. 28, 1986]

§ 169.682 Distribution and circuit loads.

(a) Except as provided in paragraph (b) of this section, the connected load on a lighting branch circuit must not exceed 80 percent of the rating of the overcurrent protective device, computed using the greater of—

- (1) The lamp sizes to be installed; or
- (2) 50 watts per outlet.

(b) Circuits supplying electrical discharge lamps must be computed using the ballast input current.

(c) The branch circuit cables for motor and lighting loads must be no smaller than No. 14 AWG.

§ 169.683 Overcurrent protection, general.

(a) Overcurrent protection must be provided for each ungrounded conductor for the purpose of opening the electric circuit if the current reaches a value that causes an excessive or dangerous temperature in the conductor or conductor insulation.

(b) Disconnect means must be provided on the supply side of and adjacent to all fuses for the purpose of de-energizing the fuses for inspection and maintenance purposes. All disconnect means must open all ungrounded conductors of the circuit simultaneously.

(c) Each conductor, including a generator lead and shore power cable, must be protected in accordance with its current-carrying capacity.

(d) If the allowable current-carrying capacity of a conductor does not correspond to a standard size fuse, the next larger size or rating may be used

but not exceeding 150 percent of the allowable current-carrying capacity of the conductor.

(e) Plug (screw in type) fuses and fuseholders must not be used in circuits exceeding 125 volts between conductors. The screw shell of plug type fuseholders must be connected to the load of the circuit. Edison base fuses may not be used.

(f) If the allowable current-carrying capacity of the conductor does not correspond to a standard rating of circuit breakers, the next larger rating not exceeding 150 percent of the allowable current-carrying capacity of the conductor may be used.

(g) Lighting branch circuits must be protected against overcurrent either by fuses or circuit breakers rated at not more than 20 amperes.

(h) Each circuit breaker must be of the manually reset type designed for—

- (1) Inverse time delay;
- (2) Instantaneous short circuit protection; and
- (3) Repeated opening of the circuit in which it is to be used without damage to the circuit breaker.

(i) Circuit breakers must indicate whether they are in the open or closed position.

(j) Devices such as instruments, pilot lights, ground detector lights, potential transformers, etc. must be supplied by circuits protected by overcurrent devices.

(k) Each generator must be protected with an overcurrent device set at a value not exceeding 15 percent above the full-load rating for continuous rated machines or the overload rating for special rated machines.

§ 169.684 Overcurrent protection for motors and motor branch circuits.

(a) Except as provided in paragraph (d) of this section, each motor must be provided with running protection against overcurrent. A protective device integral with the motor that is responsive to motor current or to both motor current and temperature may be used.

(b) The motor branch circuit conductors, the motor control apparatus, and the motors must be protected against overcurrent due to short circuits or grounds with overcurrent devices.

(c) The motor branch circuit overcurrent device must be capable of carrying the starting current of the motor.

(d) Each manually started continuous duty motor, rated at one horsepower or less, that is within sight from the starter location, is considered as protected against overcurrent by the overcurrent device protecting the conductors of the branch circuit.

§ 169.685 Electric heating and cooking equipment.

(a) Each electric space heater for heating rooms and compartments must be provided with thermal cutouts to prevent overheating. Each heater must be so constructed and installed as to prevent the hanging of towels, clothing, etc., on the heater, and to prevent overheating of heater parts and adjacent bulkheads or decks.

(b) All electric cooking equipment, attachments, and devices, must be of rugged construction and so designed as to permit complete cleaning, maintenance, and repair.

(c) Doors for electric cooking equipment must be provided with heavy duty hinges and locking devices to prevent accidental opening in heavy seas.

(d) Electric cooking equipment must be mounted to prevent dislodgment in heavy seas.

(e) For each grill or similar type cooking equipment, means must be provided to collect grease or fat and to prevent spillage on wiring or the deck.

(f) Where necessary for safety of personnel, grab rails must be provided. Each electric range must be provided with sea rails with suitable barriers to resist accidental movement of cooking pots.

§ 169.686 Shore power.

If a shore power connection is provided it must meet the following requirements:

(a) A shore power connection box or receptacle and a cable connecting this box or receptacle to the main distribution panel must be permanently installed in an accessible location.

(b) The shore power cable must be provided with a disconnect means located on or near the main distribution panel.

ELECTRICAL INSTALLATIONS ON VESSELS
OF 100 GROSS TONS AND OVER

§ 169.687 General.

Except as provided in this subpart, electrical installations on vessels of 100 gross tons and over must meet the requirements of parts 110–113 of this chapter.

§ 169.688 Power supply.

(a) The requirements of this section apply in lieu of subpart 111.10 of this chapter.

(b) If a generator is used to provide electric power for any vital system listed in §169.642 of this subchapter, at least two generating sets must be provided. At least one required generating set must be independent of the auxiliary propulsion machinery. A generator that is not independent of the auxiliary propulsion plant must meet the requirements of §111.10-4(c) of this chapter. With any one generating set stopped, the remaining set(s) must provide the power necessary for each of the following:

(1) Normal at sea load plus starting of the largest vital system load that can be started automatically or started from a space remote from the main distribution panel (switchboard).

(2) All vital systems simultaneously with nonvital loads secured.

(c) The adequacy of ship service generators must be demonstrated to the satisfaction of the OCMI during the initial inspection required by §169.221 of this subchapter.

§ 169.689 Demand loads.

Demand loads must meet §111.60-7 of this chapter except that smaller demand loads for motor feeders are acceptable if the cable is protected at or below its current-carrying capacity.

§ 169.690 Lighting branch circuits.

Each lighting branch circuit must meet the requirements of §111.75-5 of this chapter, except that—

(a) Appliance loads, electric heater loads, and isolated small motor loads may be connected to a lighting distribution panelboard; and

(b) Branch circuits in excess of 30 amperes may be supplied from a lighting distribution panelboard.

§ 169.691 Navigation lights.

Navigation light systems must meet the requirements of §111.75-17 of this chapter except the requirements of §111.75-17 (a) and (c).

§ 169.692 Remote stop stations.

In lieu of the remote stopping systems required by subpart 111.103 of this chapter, remote stop stations must be provided as follows:

(a) A propulsion shutdown in the pilothouse for each propulsion unit,

(b) A bilge slop or dirty oil discharge shutdown at the deck discharge,

(c) A ventilation shutdown located outside the space ventilated, and

(d) A shutdown from outside the engineroom for the fuel transfer pump, fuel oil service pump, or any other fuel oil pump.

§ 169.693 Engine order telegraph systems.

An engine order telegraph system is not required.

Subpart 169.700—Vessel Control, Miscellaneous Systems, and Equipment

§ 169.703 Cooking and heating.

(a) Cooking and heating equipment must be suitable for marine use. Cooking installations must meet the requirements of ABYC Standard A-3, "Recommended Practices and Standards Covering Galley Stoves."

(b) The use of gasoline for cooking, heating or lighting is prohibited on all vessels.

(c) The use of liquefied petroleum gas (LPG) or compressed natural gas (CNG) is authorized for cooking purposes only.

(1) The design, installation and testing of each LPG system must meet either ABYC A-1 or Chapter 6 of NFPA 302.

(2) The design, installation, and testing of each CNG system must meet either Chapter 6 of NFPA 302 or ABYC A-22.

(3) The stowage of each cylinder must comply with the requirements for the stowage of cylinders of liquefied or non-liquefied gases used for heating,

cooking, or lighting in part 147 of this chapter.

(4) If the fuel supply line enters an enclosed space on the vessel, a remote shutoff valve must be installed which can be operated from a position adjacent to the appliance. The valve must be a type that will fail closed, and it must be located between the regulator and the point where the fuel supply enters the enclosed portion of the vessel.

(5) If Chapter 6 of NFPA 302 is used as the standard, then the following additional requirements must also be met:

(i) LPG or CNG must be odorized in accordance with ABYC A-1.5.d or A-22.5.b, respectively.

(ii) Ovens must be equipped with a flame failure switch in accordance with ABYC A-1.10.b for LPG or A-22.10.b for CNG.

(iii) The marking and mounting of LPG cylinders must be in accordance with ABYC-1.6.b.

(iv) LPG cylinders must be of the vapor withdrawal type as specified in ABYC A-1.5.b.

(6) If ABYC A-1 or A-22 is used as the standard for an LPG or CNG installation, then pilot lights or glow plugs are prohibited.

(7) If ABYC A-22 is used as the standard for a CNG installation, then the following additional requirements must also be met:

(i) The CNG cylinders, regulating equipment, and safety equipment must meet the installation, stowage, and testing requirements of paragraphs 6-5.11.1, 2, 3; 6-5.11.5; and 6-5.11.8 of NFPA 302.

(ii) The use or stowage of stoves with attached cylinders is prohibited as specified in paragraph 6-5.1 of NFPA 302.

§ 169.705 Mooring equipment.

Each vessel must be fitted with ground tackle and hawsers deemed necessary by the Officer in Charge, Marine Inspection, depending upon the size of the vessel and the waters on which it operates.

§ 169.709 Compass.

(a) Each vessel must be fitted with a magnetic steering compass.

(b) Each vessel certificated for exposed water service must have an

emergency compass in addition to the one required in paragraph (a).

§ 169.711 Emergency lighting.

(a) Each vessel must be equipped with a suitable number of portable battery lights.

(b) Each vessel of 100 gross tons and over must satisfy the emergency lighting requirements for a miscellaneous self-propelled vessel as contained in part 112 of this chapter.

(c) Each vessel of less than 100 gross tons that has accommodation spaces located below the main deck must have permanently installed lighting which is connected to a single emergency power source or permanently installed, relay-controlled, battery-operated lanterns. The lighting or lanterns must be fitted along the avenues of escape, in the wheelhouse, and in the engine compartment.

(1) A single emergency power source, if provided, must be independent of the normal power source and must be either a generator or a storage battery.

(d) The emergency power source and batteries for individual, battery-operated, lanterns must have the capacity to supply all connected loads simultaneously for at least 6 hours of continuous operations. If the emergency lighting is provided by battery power, then an automatic battery charger that maintains the battery(s) in a fully charged condition must be provided.

(e) The emergency lighting system must be capable of being fully activated from a single location.

§ 169.713 Engineroom communication system.

An efficient communication system must be provided between the principal steering station and the engineroom on vessels which are not equipped with pilothouse controls if, in the opinion of the Officer in Charge, Marine Inspection, this is necessary for proper operation of the vessel.

§ 169.715 Radio.

(a) Radiotelegraph and radiotelephone installations are required on certain vessels. Details of these requirements and the details of the installations are contained in regulations

§ 169.717

of the Federal Communications Commission (FCC) in Title 47, Code of Federal Regulations, part 83.

(b) A valid certificate issued by the FCC is evidence that the radio installation is in compliance with the requirements of that agency.

§ 169.717 Fireman's outfit.

(a) Each vessel greater than 120 feet but less than 150 feet in length must carry one fireman's outfit consisting of—

(1) One pressure-demand, open-circuit, self-contained breathing apparatus, approved by the Mine Safety and Health Administration (MSHA) and by the National Institute for Occupational Safety and Health (NIOSH) and having at a minimum a 30-minute air supply and a full facepiece; but a self-contained compressed-air breathing apparatus previously approved by MSHA and NIOSH under part 160, subpart 160.011, of this chapter may continue in use as required equipment if it was part of the vessel's equipment on November 23, 1992, and as long as it is maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection;

(2) One lifeline with a belt or a suitable harness;

(3) One approved flame safety lamp;

(4) One flashlight listed by an independent testing laboratory as suitable for use in hazardous locations;

(5) One fire ax;

(6) Boots and gloves of rubber or other electrically nonconducting material;

(7) A rigid helmet that provides effective protection against impact; and

(8) Protective clothing.

(b) Each vessel 150 feet or greater must carry two fireman's outfits. The outfits must be stowed in widely separated accessible locations.

(c) Lifelines must be of steel or bronze wire rope. Steel wire rope must be either inherently corrosion resistant or made so by galvanizing or thinning. Each end must be fitted with a hook with keeper having a throat opening which can be readily slipped over a $\frac{5}{8}$ -inch bolt. The total length of the lifeline is dependent upon the size and arrangement of the vessel, and more than one line may be hooked together to

46 CFR Ch. I (10–1–98 Edition)

achieve the necessary length. No individual length of lifeline may be less than 50 feet in length. The assembled lifeline must have a minimum breaking strength of 1,500 pounds.

(d) A complete recharge must be carried out for each self-contained breathing apparatus and a complete set of spare batteries and bulb must be carried for each flashlight. The spares must be stowed in the same location as the equipment it is to reactivate.

(e) Protective clothing must be constructed of material that will protect the skin from the heat of fire and burns from scalding steam. The outer surface must be water resistant.

[CGD 83-005, 51 FR 896, Jan. 9, 1986, as amended by CGD 86-036, 57 FR 48326, Oct. 23, 1992]

§ 169.721 Storm sails and halyards (exposed and partially protected waters only).

(a) Unless clearly unsuitable, each vessel must have one storm trysail of appropriate size. It must be sheeted independently of the boom and must have neither headboard nor battens.

(b) Each vessel having headsails must also have one storm head sail of appropriate size and strength.

(c) Each vessel must have at least two halyards, each capable of hoisting a sail.

§ 169.723 Safety belts.

Each vessel must carry a harness type safety belt conforming to Offshore Racing Council (ORC) standards for each person on watch or required to work the vessel in heavy weather.

169.725 First aid kit.

Each vessel must carry an approved first aid kit, constructed and fitted in accordance with subpart 160.041 of this chapter.

§ 169.726 Radar reflector.

Each nonmetallic vessel less than 90 feet in length must exhibit a radar reflector of suitable size and design while underway.

MARKINGS

§ 169.730 General alarm bell switch.

On vessels of 100 gross tons and over there must be a general alarm bell

switch in the pilothouse, clearly and permanently identified by lettering on a metal plate or with a sign in red letters on a suitable background: "GENERAL ALARM"

§ 169.731 General alarm bells.

On vessels of 100 gross tons and over each general alarm bell must be identified by red lettering at least ½ inch high: "GENERAL ALARM—WHEN BELL RINGS GO TO YOUR STATION."

§ 169.732 Carbon dioxide alarm.

Each carbon dioxide alarm must be conspicuously identified: "WHEN ALARM SOUNDS—VACATE AT ONCE. CARBON DIOXIDE BEING RELEASED."

§ 169.733 Fire extinguishing branch lines.

Each branch line valve of every fire extinguishing system must be plainly and permanently marked indicating the spaces served.

§ 169.734 Fire extinguishing system controls.

Each control cabinet or space containing valves or manifolds for the various fire extinguishing systems must be distinctly marked in conspicuous red letters at least 2 inches high: "CARBON DIOXIDE FIRE EXTINGUISHING SYSTEM," or "HALON FIRE EXTINGUISHING SYSTEM," as appropriate.

§ 169.735 Fire hose stations.

Each fire hydrant must be identified in red letters and figures at least two inches high "FIRE STATION NO. 1," "2," "3," etc. Where the hose is not stowed in the open or readily seen behind glass, this identification must be placed so as to be readily seen from a distance.

§ 169.736 Self-contained breathing apparatus.

Each locker or space containing self-contained breathing apparatus must be marked "SELF-CONTAINED BREATHING APPARATUS."

§ 169.737 Hand portable fire extinguishers.

Each hand portable fire extinguisher must be marked with a number, and the location where it is stowed must be marked with a corresponding number. The marks must be at least ½ inch high. Where only one type and size of hand portable fire extinguisher is carried, the numbering may be omitted.

§ 169.738 Emergency lights.

Each emergency light must be marked with a letter "E" at least ½ inch high.

§ 169.739 Lifeboats.

(a) The name and port of the vessel marked on its stern as required by § 67.15 of this chapter must be plainly marked or painted on each side of the bow of each lifeboat in letters not less than 3 inches high.

(b) Each lifeboat must have its number plainly marked or painted on each side of the bow in figures not less than 3 inches high. The lifeboats on each side of the vessel must be numbered from forward aft, with the odd numbers on the starboard side.

(c) The cubical contents and number of persons allowed to be carried in each lifeboat must be plainly marked or painted on each side of the bow of the lifeboat in letters and numbers not less than 1½ inches high. In addition, the number of persons allowed must be plainly marked or painted on top of at least 2 thwarts in letters and numbers not less than 3 inches high.

(d) Each oar must be conspicuously marked with the vessel's name.

(e) Where mechanical disengaging apparatus is used, the control effecting the release of the lifeboat must be painted bright red and must have thereon in raised letters either the words—"DANGER-LEVER DROPS BOAT", or the words—"DANGER-LEVER RELEASES HOOKS".

(f) The top of thwarts, side benches and footings of lifeboats must be painted or otherwise colored international orange. The area in way of the red mechanical disengaging gear control lever, from the keel to the side bench, must be painted or otherwise colored white, to provide a contrasting background for the lever. This band of

§ 169.740

white should be approximately 12 inches wide depending on the internal arrangements of the lifeboat.

§ 169.740 Liferafts and lifefloats.

(a) Rigid type liferafts and lifefloats, together with their oars and paddles, must be conspicuously marked with the vessel's name and port of the vessel as marked on its stern as required by §67.15 of this chapter.

(b) The number of persons allowed on each rigid type liferaft and lifefloat must be conspicuously marked or painted thereon in letters and numbers at least 1½ inches high.

(c) There must be stenciled in a conspicuous place in the immediate vicinity of each inflatable liferaft the following:

INFLATABLE LIFERAFT NO———

———PERSONS CAPACITY

These markings must not be placed on the inflatable liferaft containers.

§ 169.741 Personal flotation devices and ring life buoys.

Each personal flotation device and ring life buoy must be marked with the vessel's name.

§ 169.743 Portable magazine chests.

Portable magazine chests must be marked in letters at least 3 inches high: "PORTABLE MAGAZINE CHEST—FLAMMABLE—KEEP LIGHTS AND FIRE AWAY."

§ 169.744 Emergency position indicating radio beacon (EPIRB).

Each EPIRB must be marked with the vessel's name.

§ 169.745 Escape hatches and emergency exits.

Each escape hatch and other emergency exit must be marked on both sides using at least 1-inch letters: "EMERGENCY EXIT, KEEP CLEAR", unless the markings are deemed unnecessary by the Officer in Charge, Marine Inspection.

§ 169.746 Fuel shutoff valves.

Each remote fuel shutoff station must be marked in at least 1-inch let-

46 CFR Ch. I (10–1–98 Edition)

ters indicating purpose of the valves and direction of operation.

§ 169.747 Watertight doors and hatch-
es.

Each watertight door and watertight hatch must be marked on both sides in at least 1-inch letters: "WATERTIGHT DOOR—CLOSE IN EMERGENCY" or "WATERTIGHT HATCH—CLOSE IN EMERGENCY", unless the markings are deemed unnecessary by the Officer in Charge, Marine Inspection.

§ 169.750 Radio call sign.

Each vessel certificated for exposed or partially protected water service must have its radio call sign permanently displayed or readily available for display upon its deck or cabin top in letters at least 18 inches high.

§ 169.755 Draft marks and draft indi-
cating systems.

(a) All vessels must have draft marks plainly and legibly visible upon the stem and upon the sternpost or rudderpost or at any place at the stern of the vessel as may be necessary for easy observance. The bottom of each mark must indicate the draft.

(b) The draft must be taken from the bottom of the keel to the surface of the water at the location of the marks.

(c) In cases where the keel does not extend forward or aft to the location of the draft marks, due to a raked stem or cut away skeg, the draft must be measured from a line projected from the bottom of the keel forward or aft, as the case may be, to the location of the draft marks.

(d) In cases where a vessel may have a skeg or other appendage extending locally below the line of the keel, the draft at the end of the vessel adjacent to such appendage must be measured to a line tangent to the lowest part of such appendage and parallel to the line of the bottom of the keel.

(e) Draft marks must be separated so that the projections of the marks onto a vertical plane are of uniform height equal to the vertical spacing between consecutive marks.

(f) Draft marks must be painted in contrasting color to the hull.

(g) In cases where draft marks are obscured due to operational constraints

or by protrusions, the vessel must be fitted with a reliable draft indicating system from which the bow and stern drafts can be determined.

[CGD 89-037, 57 FR 41824, Sept. 11, 1992]

Subpart 169.800—Operations

§ 169.805 Exhibition of licenses.

Licensed personnel on any vessel subject to this subchapter shall have their licenses in their possession and available for examination at all times when the vessel is being operated.

§ 169.807 Notice of casualty.

(a) The owner, agent, master, or person in charge of a vessel involved in a marine casualty shall give notice as soon as possible to the nearest Coast Guard Marine Safety or Marine Inspection Office, whenever the casualty involves any of the following:

(1) Each accidental grounding and each intentional grounding which also meets any of the other reporting criteria or creates a hazard to navigation, the environment or the safety of the vessel;

(2) Loss of main propulsion or primary steering or any associated component or control system which causes a reduction of the maneuvering capabilities of the vessel. Loss means that systems, components, sub-system or control systems do not perform the specified or required function;

(3) An occurrence materially and adversely affecting the vessel's seaworthiness or fitness for service or route, including but not limited to fire, flooding, or failure or damage to fixed fire extinguishing systems, lifesaving equipment, auxiliary power generating equipment, Coast Guard approved equipment or bilge pumping systems;

(4) Loss of life;

(5) Injury causing a person to remain incapacitated for a period in excess of 72 hours; or

(6) An occurrence resulting in damage to property in excess of \$25,000.00. Damage includes the cost necessary to restore the property to the service condition which existed prior to the casualty but does not include the cost of salvage, gas freeing, drydocking, or demurrage.

(b) The notice must include the name and official number of the vessel involved, the name of the vessel's owner or agent, nature, location and circumstances of the casualty, nature and extent of injury to persons, and the damage to property.

(c) In addition to the notice required, the person in charge of the vessel shall report in writing or in person, as soon as possible to the Officer in Charge, Marine Inspection at the port in which the casualty occurred or nearest the port of first arrival. Casualties must be reported on Form CG-2692.

(d) The owner, agent, master, or other person in charge of any vessel involved in a marine casualty shall retain for three years the voyage records of the vessel such as both rough and smooth deck and engineroom logs, navigation charts, navigation work books, compass deviation cards, gyro-compass records, record of draft, aids to mariners, radiograms sent and received, the radio log, and crew, sailing school student, instructor, and guest lists. The owner agent, master, or other officer in charge, shall make these records available to a duly authorized Coast Guard officer or employee for examination upon request.

(e) Whenever a vessel collides or is connected with a collision with a buoy or other aid to navigation under the jurisdiction of the Coast Guard, the person in charge of the vessel shall report the accident to the nearest Officer in Charge, Marine Inspection. A report on Form CG-2692 is not required unless any of the results listed in paragraph (b) of this section occur.

§ 169.809 Charts and nautical publications.

As appropriate for the intended voyage, all vessels must carry adequate and up-to-date—

- (a) Charts;
- (b) Sailing directions;
- (c) Coast pilots;
- (d) Light lists;
- (e) Notices to mariners;
- (f) Tide tables; and
- (g) Current tables.

§ 169.813 Station bills.

(a) A station bill (muster list) shall be prepared and signed by the master

of the vessel. The master shall ensure that the bill is posted in conspicuous locations throughout the vessel, particularly in the living spaces, before the vessel sails.

(b) The station bill must set forth the special duties and duty station of each member of the ship's company for the various emergencies. The duties must, as far as possible, be comparable with the regular work of the individual. The duties must include at least the following and any other duties necessary for the proper handling of a particular emergency:

(1) The closing of airports, watertight doors, scuppers, sanitary and other discharges which lead through the vessel's hull below the margin line, etc., the stopping of fans and ventilating systems, and the operating of all safety equipment.

(2) The preparing and launching of lifeboats and liferafts.

(3) The extinguishing of fire.

(4) The mustering of guests, if carried, including the following:

(i) Warning the guests.

(ii) Seeing that they are dressed and have put on their personal flotation devices in a proper manner.

(iii) Assembling the guests and directing them to the appointed stations.

(iv) Keeping order in the passageways and stairways and generally controlling the movement of the guests.

(v) Seeing that a supply of blankets is taken to the lifeboats.

§ 169.815 Emergency signals.

(a) The station bill must set forth the various signals used for calling the ship's company to their stations and for giving instructions while at their stations.

(b) On vessels of 100 gross tons and over the following signals must be used.

(1) The first alarm signal must be a continuous blast of the vessel's whistle for a period of not less than 10 seconds supplemented by the continuous ringing of the general alarm bells for not less than 10 seconds.

(2) For dismissal from fire alarm stations, the general alarm must be sounded three times supplemented by three short blasts of the vessel's whistle.

(3) The signal for boat stations or boat drill must be a succession of more than six short blasts, followed by one long blast, of the vessel's whistle supplemented by a comparable signal on the general alarm bells.

(4) For dismissal from boat stations, there must be three short blasts of the whistle.

(c) Where whistle signals are used for handling the lifeboats, they must be as follows:

(1) To lower lifeboats, one short blast.

(2) To stop lowering the lifeboats, two short blasts.

§ 169.817 Master to instruct ship's company.

The master shall conduct drills and give instructions as necessary to insure that all hands are familiar with their duties as specified in the station bill.

§ 169.819 Manning of lifeboats and liferafts.

(a) The provisions of this section shall apply to all vessels equipped with lifeboats and/or liferafts.

(b) The master shall place a licensed deck officer, an able seaman, or a certificated lifeboatman in command of each lifeboat or liferaft. Each lifeboat or liferaft with a prescribed complement of 25 or more persons must have one additional certificated lifeboatman.

(c) The person in charge of each lifeboat or liferaft shall have a list of its assigned occupants, and shall see that the persons under his orders are acquainted with their duties.

§ 169.821 Patrol person.

(a) The master shall designate a member of the ship's company to be a roving patrol person, whenever the vessel is operational.

(b) The roving patrol person shall frequently visit all areas to ensure that safe conditions are being maintained.

§ 169.823 Openings.

(a) Except as provided in paragraph (b) of this section, all watertight doors in subdivision bulkheads, hatches, and openings in the hull must be kept closed during the navigation of the vessel.

(b) The master may permit hatches or other openings to be uncovered or opened for reasonable purposes such as ship's maintenance, when existing conditions warrant the action and the openings can readily be closed.

§ 169.824 Compliance with provisions of certificate of inspection.

The master or person in charge of the vessel shall see that all of the provisions of the certificate of inspection are strictly adhered to. Nothing in this subpart shall be construed as limiting the master or person in charge of the vessel, on his own responsibility, from diverting from the route prescribed in the certificate of inspection or taking such other steps as he deems necessary and prudent to assist vessels in distress or for other similar emergencies.

§ 169.825 Wearing of safety belts.

The master of each vessel shall ensure that each person wears an approved safety harness when aloft or working topside in heavy weather.

TESTS, DRILLS, AND INSPECTIONS

§ 169.826 Steering, communications and control.

The master shall test the vessel's steering gear, signaling whistle, engine controls, and communications equipment prior to getting underway.

§ 169.827 Hatches and other openings.

The master is responsible for seeing that all hatches, openings in the hull, and watertight doors are properly closed tight.

§ 169.829 Emergency lighting and power systems.

(a) Where fitted, the master shall have the emergency lighting and power systems operated and inspected at least once in each week that the vessel is navigated to ensure that the system is in proper operating condition.

(b) The master shall have the internal combustion engine driven emergency generators operated under load for at least 2 hours at least once in each month that the vessel is navigated.

(c) The master shall have the storage batteries for emergency lighting and

power systems tested at least once in each 6-month period that the vessel is navigated to demonstrate the ability of the storage battery to supply the emergency loads for the specified period of time.

(d) The date of each test and the condition and performance of the apparatus must be noted in the official log-book.

§ 169.831 Emergency position indicating radio beacon (EPIRB).

The master shall ensure that—

(a) The EPIRB required in § 169.555 of this subchapter is tested monthly, using the integrated test circuit and output indicator, to determine that it is operative; and

(b) The EPIRB's battery is replaced after the EPIRB is used and before the marked expiration date.

§ 169.833 Fire and boat drills.

(a) When the vessel is operating, the master shall conduct a fire and boat drill each week. The scheduling of drills is at the discretion of the master except that at least one fire and boat drill must be held within 24 hours of leaving a port if more than 25 percent of the ship's company have been replaced at that port.

(b) The fire and boat drill must be conducted as if an actual emergency existed. All persons on board including guests shall report to their respective stations and be prepared to perform the duties specified in the station bill.

(1) Fire pumps must be started and a sufficient number of outlets used to ascertain that the system is in proper working order.

(2) All rescue and safety equipment must be brought from the emergency equipment lockers and the persons designated must demonstrate their ability to use the equipment.

(3) All watertight doors which are in use while the vessel is underway must be operated.

(4) Weather permitting, lifeboat covers and strongbacks must be removed, plugs or caps put in place, boat ladders secured in position, painters led forward and tended, and other life saving equipment prepared for use. The motor

and hand-propelling gear of each lifeboat, where fitted, must be operated for at least 5 minutes.

(5) In port, every lifeboat must be swung out, if practicable. The unobstructed lifeboats must be lowered to the water and the ship's company must be exercised in the use of the oars or other means of propulsion. Although all lifeboats may not be used in a particular drill, care must be taken that all lifeboats are given occasional use to ascertain that all lowering equipment is in proper order and the crew properly trained. The master shall ensure that each lifeboat is lowered to the water at least once every 3 months.

(6) When the vessel in underway, and weather permitting, all lifeboats must be swung out to ascertain that the gear is in proper order.

(7) The person in charge of each lifeboat and liferaft shall have a list of its crew and shall ensure that the persons under his or her command are acquainted with their duties.

(8) Lifeboat equipment must be examined at least once a month to ensure that it is complete.

(9) The master shall ensure that all persons on board fully participate in these drills and that they have been instructed in the proper method of donning and adjusting the personal flotation devices and exposure suits used and informed of the stowage location of these devices.

(c) The master shall have an entry made in the vessel's official logbook relative to each fire and boat drill setting forth the date and hour, length of time of the drill, numbers on the lifeboats swung out and numbers on those lowered, the length of time that motor and hand-propelled lifeboats are operated, the number of lengths of hose used, together with a statement as to the condition of all fire and lifesaving equipment, watertight door mechanisms, valves, etc. An entry must also be made to report the monthly examination of the lifeboat equipment. If in any week the required fire and boat drills are not held or only partial drills are held, an entry must be made stating the circumstances and extend of the drills held.

(d) A copy of these requirements must be framed under glass or other

transparent material and posted in a conspicuous place about the vessel.

§ 169.837 Lifeboats, liferafts, and lifefloats.

(a) The master or person in charge shall ensure that the lifeboats, rescue boats, liferafts, and lifefloats, are properly maintained at all times, and that all equipment for the vessel required by the regulations in this subchapter is provided, maintained, and replaced as indicated or when necessary and no less frequently than required by paragraph (b) of this section.

(b) The master shall ensure that:

(1) Each lifeboat has been stripped, cleaned and thoroughly overhauled at least once in each year.

(2) The fuel tanks of motor propelled lifeboats have been emptied and fuel changed once every twelve months.

(3) Each lifefloat has been cleaned and thoroughly overhauled once every twelve months.

(4) Each inflatable liferaft has been serviced at an approved facility every 12 months or not later than the next vessel; inspection for certification if the time since the date of the last servicing does not exceed 15 months.

§ 169.839 Firefighting equipment.

(a) The master or person in charge shall ensure that the vessel's firefighting equipment is at all times ready for use and that all firefighting equipment required by the regulations in this subchapter is provided, maintained, and replaced as indicated.

(b) The master or person in charge shall have performed at least once every 12 months the tests and inspections of all hand portable fire extinguishers, semiportable fire extinguishing systems, and fixed fire extinguishing systems on board as described in § 169.247 of this subchapter. The master or person in charge shall keep records of the tests and inspections showing the dates when performed, the number and/or other identification of each unit tested and inspected, and the name(s) of the person(s) and/or company conducting the tests and inspections. These records must be made available to the marine inspectors upon request and must be kept for the period of validity of the vessel's current certificate

of inspection. Conducting these tests and inspections does not relieve the master or person in charge of his responsibility to maintain this firefighting equipment in proper condition at all times.

§ 169.840 Verification of vessel compliance with applicable stability requirements.

(a) After loading and prior to departure and at all other times necessary to assure the safety of the vessel, the master shall determine that the vessel complies with all applicable stability requirements in the vessel's trim and stability book, stability letter, Certificate of Inspection, and Load Line Certificate, as the case may be, and then enter an attestation statement of the verification in the log book. The vessel may not depart until it is in compliance with these requirements.

(b) When determining compliance with applicable stability requirements the vessel's draft, trim, and stability must be determined as necessary and any stability calculations made in support of the determination must be retained on board the vessel for the duration of the voyage.

[CGD 89-037, 57 FR 41825, Sept. 11, 1992]

§ 169.841 Logbook entries.

(a) Each vessel subject to the inspection provisions of this subchapter must have an official logbook.

(b) The master shall place all entries required by law or regulation in the logbook.

(c) A Coast Guard form "Official Logbook" may be utilized or the owner may utilize his own format for an official logbook. The logs must be kept available for review by the Coast Guard for a period of one year after the date to which the records refer or for the period of validity of the vessel's current certificate of inspection, whichever is longer.

(d) All tests, drills, inspections and notifications required in this subchapter must be entered in the official logbook.

(e) Prior to getting underway the master shall enter in the logbook the name of each sailing school student, sailing school instructor, and guest on-board, and the fact that each person

was notified of the applicable safety standards for sailing school vessels as required by § 169.857 of this chapter.

§ 169.847 Lookouts.

Nothing in this part exonerates any master or officer of the watch from the consequences of any neglect to keep a proper lookout.

§ 169.849 Posting placards containing instructions for launching and inflating inflatable liferafts.

Every vessel equipped with inflatable liferafts must have posted in conspicuous places readily accessible to the ship's company and guests approved placards containing instructions for launching and inflating inflatable liferafts. The number and location of such placards for a particular vessel shall be determined by the Officer in Charge, Marine Inspection.

§ 169.853 Display of plans.

(a) Each vessel of 100 gross tons and over must have permanently exhibited for the guidance of the master, general arrangement plans for each deck showing the fire control stations, the various sections enclosed by fire resisting bulkheads, the sections enclosed by fire retarding bulkheads, together with the particulars of the fire alarms, detecting systems, fire extinguishing appliances, means of access to different compartments, ventilation systems and the position of dampers and remote stops.

(b) Plans must clearly show for each deck the boundaries of the watertight compartments, the openings therein with the means of closure and the position of any controls, and the arrangements for the correction of any list due to flooding.

§ 169.855 Pre-underway training.

Prior to getting underway the master shall ensure that each sailing school student and sailing school instructor, who has not previously been instructed, is instructed in the handling of sails, emergency procedures, nautical terms, location and use of lifesaving and firefighting equipment, and the general layout of the vessel.

§ 169.857 Disclosure of safety standards.

(a) This section applies to all sailing school vessels and all promotional literature or advertisements offering passage or soliciting sailing school students or instructors for voyages on sailing school vessels.

(b) Each item of promotional literature or advertisement that offers passage or solicits students or instructors of voyages onboard a sailing school vessel must contain the following information:

- (1) The name of the vessel;
- (2) The country of registry;

(3) A statement detailing the role and responsibility of a sailing school student or instructor; and

(4) A statement that the vessel is inspected and certificated as a sailing school vessel and is not required to meet the same safety standards required of a passenger vessel on a comparable route.

(c) Before getting underway the master shall ensure that each sailing school student, sailing school instructor, and guest, who has not previously been notified, is notified of the specialized nature of sailing school vessels and that the applicable safety requirements for these vessels are not the same as those applied to passenger vessels.

SUBCHAPTER S—SUBDIVISION AND STABILITY

PART 170—STABILITY REQUIREMENTS FOR ALL INSPECTED VESSELS

Subpart A—General Provisions

Sec.

- 170.001 Applicability.
- 170.003 Right of appeal.
- 170.005 Vessel alteration or repair.
- 170.010 Equivalents.
- 170.015 Incorporation by reference.
- 170.020 OMB control numbers assigned pursuant to the Paperwork Reduction Act.

Subpart B—Definitions

- 170.050 General terms.
- 170.055 Definitions concerning a vessel.

Subpart C—Plan Approval

- 170.070 Applicability.
- 170.075 Plans.
- 170.080 Stability booklet.
- 170.085 Information required before a stability test.
- 170.090 Calculations.
- 170.093 Specific approvals.
- 170.095 Data submittal for a vessel equipped to lift.
- 170.100 Addresses for submittal of plans and calculations.

Subpart D—Stability Instructions for Operating Personnel

- 170.105 Applicability.
- 170.110 Stability booklet.
- 170.120 Stability letter.
- 170.125 Operating information for a vessel engaged in lifting.
- 170.135 Operating information for a vessel with Type III subdivision.

Subpart E—Weather Criteria

- 170.160 Specific applicability.
- 170.170 Calculations required.
- 170.173 Criterion for vessels of unusual proportion and form.

Subpart F—Determination of Lightweight Displacement and Centers of Gravity

- 170.174 Specific applicability.
- 170.175 Stability test: General.
- 170.180 Plans and information required at the stability test.
- 170.185 Stability test preparations.
- 170.190 Stability test procedure modifications.

- 170.200 Estimated lightweight vertical center of gravity.

Subpart G—Special Installations

- 170.235 Fixed ballast.
- 170.245 Form flotation material.

Subpart H—Watertight Bulkhead Doors

- 170.248 Applicability.
- 170.250 Types and classes.
- 170.255 Class 1 doors; permissible locations.
- 170.260 Class 2 doors; permissible locations.
- 170.265 Class 3 doors; required locations.
- 170.270 Door design, operation, installation, and testing.
- 170.275 Special requirements for cargo space watertight doors.

Subpart I—Free Surface

- 170.285 Free surface correction for intact stability calculations.
- 170.290 Free surface correction for damage stability calculations.
- 170.295 Special considerations for free surface of passive roll stabilization tanks.
- 170.300 Special consideration for free surface of spoil in hopper dredge hoppers.

AUTHORITY: 43 U.S.C. 1333; 46 U.S.C. 2103, 3306, 3703; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

SOURCE: CGD 79-023, 48 FR 51010, Nov. 4, 1983, unless otherwise noted.

Subpart A—General Provisions

§ 170.001 Applicability.

(a) This subchapter, except where specifically stated otherwise, applies to each vessel contracted for on or after March 11, 1996, that is—

(1) Inspected under another subchapter of this chapter; or

(2) A foreign vessel that must comply with the requirements in Subchapter 0 of this chapter.

(b) Each vessel contracted for before March 11, 1996 may be constructed in accordance with the regulations in effect at the time. However, any alterations or repairs must be done in accordance with § 170.005.

§ 170.003

(c) Certain regulations in this subchapter apply only to limited categories of vessels. Specific applicability statements are provided at the beginning of those regulations.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 89-037, 57 FR 41825, Sept. 11, 1992; CGD 85-080, 61 FR 943, Jan. 10, 1996]

§ 170.003 Right of appeal.

Any person directly affected by a decision or action taken under this subchapter, by or on behalf of the Coast Guard, may appeal therefrom in accordance with subpart 1.03 of this chapter.

[CGD 88-033, 54 FR 50382, Dec. 6, 1989]

§ 170.005 Vessel alteration or repair.

(a) Alterations and repairs to inspected vessels must be done—

(1) Under the direction of the Officer in Charge, Marine Inspection; and

(2) Except as provided in paragraph (b) of this section, in accordance with the regulations in this subchapter, to the extent practicable.

(b) Minor alterations and repairs may be done in accordance with regulations in effect at the time the vessel was contracted for.

§ 170.010 Equivalents.

Substitutions for fittings, equipment, arrangements, calculations, information, or tests required in this subchapter may be approved by the Commandant, the Commanding Officer, U.S. Coast Guard Marine Safety Center, 400 Seventh St., SW., Washington, DC 20590-0001 or the Officer in Charge, Marine Inspection, if the substitution provides an equivalent level of safety.

[CGD 89-025, 54 FR 19572, May 8, 1989, as amended by CGD 96-041, 61 FR 50734, Sept. 27, 1996]

§ 170.015 Incorporation by reference.

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a). To enforce any edition other than that specified in paragraph (b) of this section, the Coast Guard must publish notice of change in the FEDERAL REGISTER and make the material available to the public. All approved

46 CFR Ch. I (10-1-98 Edition)

material is on file at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC, and at the U.S. Coast Guard, Office of Design and Engineering Standards (G-MSE), 2100 Second Street SW., Washington, DC 20593-0001 and is available from the sources indicated in paragraph (b) of this section.

(b) The material approved for incorporation by reference in this part and the sections affected are:

American Society for Testing and Materials (ASTM)

100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
ASTM F-1196, Sliding Watertight Door Assemblies, 1989170.270
ASTM F-1197, Sliding Watertight Door Control Systems, 1989170.270

Military Specification

Naval Publications and Forms Center, Code 1052, 5801 Tabor Avenue, Philadelphia, PA 19120
MIL-P-21929B, Plastic Material, Cellular Polyurethane, Foam in Place, Rigid, 1970170.245

International Maritime Organization (IMO)

Publications Section, International Maritime Organization, 4 Albert Embankment, London SE1 7SR, United Kingdom
Resolution A.265 (VIII)170.135

[CGD 88-032, 56 FR 35827, July 29, 1991, as amended by CGD 95-072, 60 FR 50468, Sept. 29, 1995; CGD 96-041, 61 FR 50734, Sept. 27, 1996; CGD 97-057, 62 FR 51049, Sept. 30, 1997]

§ 170.020 OMB control numbers assigned pursuant to the Paperwork Reduction Act.

(a) *Purpose.* This section collects and displays the control numbers assigned to information collection and record-keeping requirements in this subchapter by the Office of Management and Budget (OMB) pursuant to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*). The Coast Guard intends that this section comply with the requirements of 44 U.S.C. 3507(f), which requires that agencies display a current control number assigned by the OMB for each approved agency information collection requirement.

(b) *Display.*

Coast Guard, DOT

§ 170.055

46 CFR part—	Current OMB control No.
§ 170.075	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.080	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.085	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.090	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.095	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.100	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.110	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.120	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.125	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.135	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.180	2115-0095, 2115-0114, 2115-0130, 2115-0131
§ 170.210	2115-0589

[CGD 89-037, 57 FR 41825, Sept. 11, 1992]

Subpart B—Definitions

§ 170.050 General terms.

(a) *Commanding Officer, Marine Safety Center (CO, MSC)* means a district commander described in 33 CFR part 3 whose command includes a merchant marine technical office or an authorized representative of the district commander.

(b) *Commandant* means the Commandant of the Coast Guard or an authorized representative of the Commandant.

(c) *Exposed waters* means waters more than 20 nautical miles (37 kilometers) from the mouth of a harbor of safe refuge and other waters which the Officer in Charge, Marine Inspection determines to present special hazards due to weather or other circumstances.

(d) *Great Lakes* includes both the waters of the Great Lakes and of the St. Lawrence River as far east as a straight line drawn from Cap de Rosiers to West Point, Anticosti Island, and west of a line along the 63rd meridian from Anticosti Island to the north shore of the St. Lawrence River.

(e) *Lakes, Bays, and Sounds* includes the waters of any lake, bay, or sound, except the Great Lakes.

(f) *Oceans* includes the waters of—

- (1) Any ocean;
- (2) The Gulf of Mexico;
- (3) The Caribbean Sea;

(4) The Gulf of Alaska; and

(5) Any other waters designated as “oceans” by the Commandant.

(g) *Officer in Charge Marine Inspection (OCMI)* means an officer of the Coast Guard who commands a Marine Inspection Zone described in 33 CFR part 3 or an authorized representative of that officer.

(h) *Oil* means oil of any kind or in any form, and includes but is not limited to petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

(i) *Partially protected waters* means—

(1) Waters within 20 nautical miles (37 kilometers) of the mouth of a harbor of safe refuge, unless determined by the OCMI to be exposed waters; and

(2) Those portions of rivers, harbors, lakes, etc. which the OCMI determines not to be sheltered.

(j) *Protected waters* means sheltered waters presenting no special hazards such as most rivers, harbors, lakes, etc.

(k) *Rivers* means any river, canal, or any other similar body of water designated by the OCMI.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

§ 170.055 Definitions concerning a vessel.

(a) *Auxiliary sailing vessel* means a vessel capable of being propelled both by mechanical means and by sails.

(b) *Barge* means a vessel not equipped with a means of self-propulsion.

(c) *Beam* or *B* means the maximum width of a vessel from—

(1) Outside of planking to outside of planking on wooden vessels; and

(2) Outside of frame to outside of frame on all other vessels.

(d) *Bulkhead deck* means the uppermost deck to which watertight bulkheads and the watertight shell extend.

(e) *Downflooding* means, except as provided in § 174.035(b), the entry of seawater through any opening into the hull or superstructure of an undamaged vessel due to heel, trim, or submergence of the vessel.

(f) *Documented alterations* means changes to the vessel which are reflected in the approved stability information carried on board the vessel.

(g) *Downflooding angle* means, except as specified by §§ 171.055(f), 172.090(d), 173.095(e), 174.015(b), and 174.035(b)(2) of this chapter, the static angle from the intersection of the vessel's centerline and waterline in calm water to the first opening that cannot be closed watertight and through which downflooding can occur.

(h) *Draft* means the vertical distance from the molded baseline amidships to the waterline.

(i) *Length* means the distance between fore and aft points on a vessel. The following specific terms are used and correspond to specific fore and aft points:

(1) *Length between perpendiculars (LBP)* means the horizontal distance measured between perpendiculars taken at the forward-most and after-most points on the waterline corresponding to the deepest operating draft. For a small passenger vessel which has underwater projections extending forward of the forward-most point or aft of the after-most point on the deepest waterline of the vessel, the Commanding Officer, U.S. Coast Guard Marine Safety Center, may include the length or a portion of the length of the underwater projections in the value used for the LBP for the purposes of this subchapter. The length or a portion of the length of projections which contribute more than 2 percent of the underwater volume of the vessel is normally added to the actual LBP.

(2) *Length overall (LOA)* means the horizontal distance between the forward-most and after-most points on the hull.

(3) *Length on the waterline (LWL)* means the horizontal distance between the forward-most and after-most points on a vessel's waterline.

(4) *Length on deck (LOD)* means the length between the forward-most and after-most points on a specified deck measured along the deck, excluding sheer.

(5) *Load line length (LLL)* has the same meaning that is provided for the term *length* in § 42.13–15(a) of this chapter.

(6) *Mean length* is the average of the length between perpendiculars (LBP) and the length on deck (LOD).

(j) *Lightweight* means with fixed ballast and with machinery liquids at operating levels but without any cargo, stores, consumable liquids, water ballast, or persons and their effects.

(k) *Main transverse watertight bulkhead* means a transverse bulkhead that must be maintained watertight in order for the vessel to meet the damage stability and subdivision requirements in this subchapter.

(l) *Major conversion*, as applied to Great Lakes bulk carriers, means a conversion of an existing vessel that substantially changes the dimensions or carrying capacity of the vessel or changes the type of vessel or substantially prolongs its life or that otherwise so changes the vessel that it is essentially a new vessel.

(m) *Permeability* is the percentage of the volume of a space that can be occupied by water.

(n) *Sailing vessel* means a vessel propelled only by sails.

(o) *Ship* means a self-propelled vessel.

(p) *Tank vessel* means a vessel that is specially constructed or converted to carry liquid bulk cargo in tanks.

(q) *Tank barge* means a tank vessel not equipped with a means of self-propulsion.

(r) *Tank ship* means a tank vessel propelled by mechanical means or sails.

(s) *Vessel* means any vessel and includes both ships and barges.

(t) *Weather deck* means the uppermost deck exposed to the weather.

(u) *Existing sailing school vessel* means a sailing vessel whose keel was laid prior to (January 9, 1986), which has an application for initial inspection for certification as a sailing school vessel on file with the Coast Guard prior to (January 9, 1987), and whose initial inspection for certification is completed prior to (January 9, 1988).

(v) *New sailing school vessel* means a sailing school vessel which is not an existing sailing school vessel.

(w) *Small passenger vessel* means a vessel of less than 100 gross tons—

(1) Carrying more than 6 passengers, including at least one passenger for hire;

(2) That is chartered with the crew provided or specified by the owner or

owner's representative and carrying more than 6 passengers;

(3) That is chartered with no crew provided or specified by the owner or owner's representative and carrying more than 12 passengers; or

(4) That is a submersible vessel carrying at least one passenger for hire.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 83-005, 51 FR 923, Jan. 9, 1986; 51 FR 3785, Jan. 30, 1986; CGD 80-159, 51 FR 33059, Sept. 18, 1986; 51 FR 35515, Oct. 6, 1986; CGD 89-037, 57 FR 41825, Sept. 11, 1992; CGD 82-004 and CGD 86-074, 60 FR 57671, Nov. 16, 1995; CGD 85-080, 61 FR 943, Jan. 10, 1996; CGD 82-004 and CGD 86-074, 62 FR 49353, Sept. 19, 1997]

Subpart C—Plan Approval

§ 170.070 Applicability.

(a) Except as provided in paragraph (b) of this section, this subpart applies to each vessel.

(b) This subpart does not apply to any of the following vessels unless the stability of the vessel is questioned by the OCM:

(1) A passenger vessel that—

(i) Is less than 100 gross tons;

(ii) Is less than 65 feet (19.8 meters) LOD measured over the weather deck; and

(iii) Carries 49 or less passengers.

(2) A deck cargo barge that complies with the requirements in § 174.020 of this chapter.

(3) A tank vessel that only carries a product listed in § 30.25-1 of this chapter and that is less than 150 gross tons.

(4) A tank barge that—

(i) Operates only in rivers or lakes, bays, and sounds service;

(ii) Does not have to meet 33 CFR part 157, subpart B; and

(iii) Only carries a product listed in § 30.25-1 of this chapter.

(5) A sailing school vessel that is an open boat that complies with the requirements in § 173.063(e) of this subchapter.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 83-005, 51 FR 923, Jan. 9, 1986]

§ 170.075 Plans.

(a) Except as provided in paragraph (b) of this section, each applicant for an original certificate of inspection

and approval of plans must also submit three copies for plan review being conducted by the Coast Guard Marine Safety Center or four copies for plan review being conducted by the American Bureau of Shipping (ABS) of each of the following plans:

(1) General arrangement plan of decks, holds, and inner bottoms including inboard and outboard profiles.

(2) Lines.

(3) Curves of form.

(4) Capacity plan showing capacities and vertical, longitudinal, and transverse centers of gravity of stowage spaces and tanks.

(5) Tank sounding tables showing—

(i) Capacities, vertical centers of gravity, and longitudinal centers of gravity in graduated intervals; and

(ii) Free surface data for each tank.

(6) Draft mark locations including longitudinal location and vertical reference points.

(b) Each small passenger vessel that is designed to comply with the alternate intact stability requirements in § 178.320 of this subchapter and the simplified method of spacing main transverse watertight bulkheads in § 179.220 of this subchapter does not have to submit the plans required by paragraph (a) of this section.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 944, Jan. 10, 1996; CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 170.080 Stability booklet.

Before issuing an original certificate of inspection, the following number of copies of the stability booklet required by § 170.110 must be submitted for approval; three copies for plan review being conducted by the Coast Guard Marine Safety Center or four copies for plan review being conducted by the ABS.

[CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 170.085 Information required before a stability test.

If a stability test is to be performed, a stability test procedure that contains the information prescribed in § 170.185(g) must be submitted to the Coast Guard Marine Safety Center or

§ 170.090

the ABS at least two weeks before the test.

[CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 170.090 Calculations.

(a) Except as provided in § 170.098, all calculations required by this subchapter must be submitted with the plans required by § 170.075.

(b) If it is necessary to compute and plot any of the following curves as part of the calculations required in this subchapter, these plots must also be submitted:

- (1) Righting arm or moment curves.
- (2) Heeling arm or moment curves.
- (3) Cross curves of stability.
- (4) Floodable length curves.

§ 170.093 Specific approvals.

Certain rules in this subchapter require specific approval of equipment or arrangements by the Commandant, OCMI, or Coast Guard Marine Safety Center. These approval determinations will be made as a part of the plan review process. When plan review is conducted by the ABS, ABS is authorized to make the approval.

[CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 170.095 Data submittal for a vessel equipped to lift.

The following data must be submitted with the plans required by § 170.075 if the vessel is engaged in lifting and is required to comply with subpart B of part 173 of this chapter:

- (a) A graph of maximum hook load versus maximum crane radius.
- (b) A table of crane radius versus the maximum distance above the main deck to which the hook load can be raised.
- (c) A table showing maximum vertical and transverse moments at which the crane is to operate.

§ 170.100 Addresses for submittal of plans and calculations.

The plans, information, and calculations required by this subpart must be submitted to one of the following:

- (a) The Marine Safety Office in the zone where the vessel is to be built or altered.
- (b) Commanding Officer, U.S. Coast Guard Marine Safety Center, 400 Sev-

46 CFR Ch. I (10-1-98 Edition)

enth St., SW., Washington, DC 20590-0001.

(c) The American Bureau of Shipping (ABS), Two World Trade Center, 106th Floor, New York, NY 10048.

(d) The American Bureau of Shipping (ABS), ABS Plaza, 16855 North Chase Dr., Houston, TX 77060-6008.

[CGD 95-028, 62 FR 51217, Sept. 30, 1997]

Subpart D—Stability Instructions for Operating Personnel

§ 170.105 Applicability.

(a) Except as provided in paragraph (b) of this section, this subpart applies to each vessel.

(b) This subpart does not apply to any of the following vessels unless the stability of the vessel is questioned by the OCMI:

(1) A deck cargo barge that complies with the requirements in § 174.020 of this chapter.

(2) A tank vessel that only carries a product listed in § 30.25-1 of this chapter and that is less than 150 gross tons.

- (3) A tank barge that—
- (i) Operates only in rivers or lakes, bays, and sounds service;
 - (ii) Does not have to meet 33 CFR part 157, subpart B; and
 - (iii) Only carries a product listed in § 30.25-1 of this chapter.

(4) A sailing school vessel that is an open boat that complies with the requirements in § 173.063(e) of this subchapter.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 83-005, 51 FR 923, Jan. 9, 1986; CGD 85-080, 61 FR 944, Jan. 10, 1996]

§ 170.110 Stability booklet.

(a) Except as provided in paragraph (e) of this section, a stability booklet must be prepared for each vessel, except for mobile offshore drilling units subject to the operating manual requirements of § 109.121 of this chapter.

(b) Each stability booklet must be approved by the Coast Guard Marine Safety Center or the ABS.

(c) Each stability book must contain sufficient information to enable the master to operate the vessel in compliance with applicable regulations in this

subchapter. Information on loading restrictions used to determine compliance with applicable intact and damage stability criteria must encompass the entire range of operating drafts and the entire range of the operating trims. Information must include an effective procedure for supervision and reporting of the opening and closing of all loading doors, where applicable.

(d) The format of the stability booklet and the information included will vary dependent on the vessel type and operation. Units of measure used in the stability booklet must agree with the units of measure of the draft markings. In developing the stability booklet, consideration must be given to including the following information:

(1) A general description of the vessel, including lightweight data.

(2) Instructions on the use of the booklet.

(3) General arrangement plans showing watertight compartments, closures, vents, downflooding angles, and allowable deck loadings.

(4) Hydrostatic curves or tables.

(5) Capacity plan showing capacities and vertical, longitudinal, and transverse centers of gravity of stowage spaces and tanks.

(6) Tank sounding tables showing capacities, vertical centers of gravity, and longitudinal centers of gravity in graduated intervals and showing free surface data for each tank.

(7) Information on loading restrictions, such as a maximum KG or minimum GM curve that can be used to determine compliance with applicable intact and damage stability criteria.

(8) Examples of loading conditions.

(9) A rapid and simple means for evaluating other loading conditions.

(10) A brief description of the stability calculations done including assumptions.

(11) General precautions for preventing unintentional flooding.

(12) A table of contents and index for the booklet.

(13) Each ship condition which, if damage occurs, may require crossflooding for survival and information concerning the use of any special crossflooding fittings.

(14) The amount and location of fixed ballast.

(15) Any other necessary guidance for the safe operation of the vessel under normal and emergency conditions.

(16) For each self-propelled hopper dredge with a working freeboard, the maximum specific gravity allowed for dredge spoil.

(e) A stability booklet is not required if sufficient information to enable the master to operate the vessel in compliance with the applicable regulations in this subchapter can be placed on the Certificate of Inspection, Load Line Certificate, or in the stability letter required in § 170.120.

(f) On board electronic stability computers may be used as an adjunct to the required booklet, but the required booklet must contain all necessary information to allow for the evaluation of the stability of any intact condition that can be evaluated by use of the computer.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 83-071, 52 FR 6979, Mar. 6, 1987; CGD 88-070, 53 FR 34537, Sept. 7, 1988; CGD 76-080, 54 FR 36977, Sept. 6, 1989; CGD 89-037, 57 FR 41825, Sept. 11, 1992; CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 170.120 Stability letter.

(a) Except as provided in paragraph (b) of this section, each vessel must have a stability letter issued by the Coast Guard or the ABS before the vessel is placed into service. This letter sets forth conditions of operation.

(b) A stability letter is not required if the information can be placed on the Certificate of Inspection or the Load Line Certificate.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 170.125 Operating information for a vessel engaged in lifting.

In addition to the information required in § 170.110, the following information must be included in the stability booklet of a vessel that is required to comply with § 173.005 of this subchapter:

(a) *Non-counterballasted vessel.* If a vessel is not counterballasted, stability information setting forth hook load limits corresponding to boom radii based on the intact stability criterion in § 173.020 must be provided.

(b) *Counterballasted vessel.* If a vessel is counterballasted with water, the following information must be provided:

(1) Instructions on the effect of the free surface of the counterballast water.

(2) Instructions on the amounts of counterballast needed to compensate for hook load heeling moments.

(3) If a vessel has fixed counterballast, a table of draft versus maximum vertical moment of deck cargo and hook load combined.

(4) If a vessel has variable counterballast, a table of draft versus maximum vertical moment of deck cargo and hook load combined for each counterballasted condition.

§ 170.135 Operating information for a vessel with Type III subdivision.

(a) In addition to the information required in § 170.110, the stability booklet of a passenger vessel with Type III subdivision must contain the information required by Regulation 8(b) of IMO Resolution A.265 (VIII).

(b) International Maritime Organization Resolution A.265 (VIII) is incorporated by reference into this part.

(c) As used in IMO Resolution A.265 (VIII), *Administration* means the Commandant, U. S. Coast Guard.

Subpart E—Weather Criteria

§ 170.160 Specific applicability

(a) Except as provided in paragraphs (b) and (c) of this section, this subpart applies to each vessel.

(b) This subpart does not apply to any of the following vessels unless the stability of the vessel is questioned by the OCMI:

(1) A deck cargo barge that complies with the requirements in § 174.020 of this chapter.

(2) A tank vessel that only carries a product listed in § 30.25–1 of this chapter and that is—

(i) Less than 150 gross tons; or

(ii) A tank barge that operates only in river or lakes, bays, and sounds service.

(3) A sailing school vessel that is an open boat that complies with the requirements in § 173.063(e) of this subchapter.

(c) This subpart does not apply to the following vessels:

(1) A tank barge that carries a product listed in Table 151.01–10(b) of this chapter.

(2) A mobile offshore drilling unit.

(3) A vessel that performs the test required by § 171.030(c) of this subchapter.

[CGD 79–023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 83–005, 51 FR 923, Jan. 9, 1986; CGD 85–080, 61 FR 944, Jan. 10, 1996]

§ 170.170 Calculations required.

(a) Each vessel must be shown by design calculations to have a metacentric height (GM) that is equal to or greater than the following in each condition of loading and operation:

$$GM \geq \frac{PAH}{W \tan (T)}$$

Where—

P=.005+(L/14,200)² tons/ft² . . . for ocean service, Great Lakes winter service, or service on exposed waters.

P=.055+(L/1309)² metric tons/m² . . . for ocean service, Great Lakes winter service, or service on exposed waters.

P=.0033+(L/14,200)² tons/ft² . . . for Great Lakes summer service or service on partially protected waters.

P=.036+(L/1309)² metric tons/m² . . . for Great lakes summer service or service on partially protected waters.

P=.0025+(L/14,200)² tons/ft² . . . for service on protected waters.

P=.028+(L/1309)² metric tons/m² . . . for service on protected waters.

L=LBP in feet (meters).

A=projected lateral area in square feet (square meters) of the portion of the vessel and deck cargo above the waterline.

H=the vertical distance in feet (meters) from the center of A to the center of the underwater lateral area or approximately to the one-half draft point.

W=displacement in long (metric) tons.

T=either:

(1) the lesser of either 14 degrees heel or the angle of heel in degrees at which one-half the freeboard to the deck edge is immersed; or

(2) for a sailing vessel, T = the lesser of either 14 degrees or the angle of heel in degrees to the deck edge.

The deck edge is to be taken as the intersection of the sideshell and the uppermost continuous deck below which the sideshell is weathertight.

(b) If approved by the Coast Guard Marine Safety Center or the ABS, a

larger value of T may be used for a vessel with a discontinuous weather deck or abnormal sheer.

(c) When doing the calculations required by paragraph (a) of this section for a sailing vessel or auxiliary sailing vessel, the vessel must be assumed—

(1) To be under bare poles; or

(2) If the vessel has no auxiliary propulsion, to have storm sails set and trimmed flat.

(d) The criterion specified in this section is generally limited in application to flush deck, mechanically powered vessels of ordinary proportions and form that carry cargo below the main deck. On other types of vessels, the Coast Guard Marine Safety Center or the ABS requires calculations in addition to those in paragraph (a) of this section. On a mechanically powered vessel under 328 feet (100 meters) in length, other than a tugboat or a towboat, the requirements in § 170.173 are applied.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983; 49 FR 37384, Sept. 24, 1984, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988; CGD 85-080, 61 FR 944, Jan. 10, 1996; 61 FR 20556, May 7, 1996; CGD 95-028, 62 FR 51217, Sept. 30, 1997]

§ 170.173 Criterion for vessels of unusual proportion and form.

(a) If required by the Coast Guard Marine Safety Center or the ABS, each mechanically powered vessel less than 328 feet (100 meters) LLL, other than a tugboat or towboat, must be shown by design calculations to comply with—

(1) Paragraph (b) or (c) of this section if the maximum righting arm occurs at an angle of heel less than or equal to 30 degrees; or

(2) Paragraph (b) of this section if the maximum righting arm occurs at an angle of heel greater than 30 degrees.

(b) Each vessel must have—

(1) An initial metacentric height (GM) of at least 0.49 feet (0.15 meters);

(2) A righting arm (GZ) of at least 0.66 feet (0.20 meters) at an angle of heel equal to or greater than 30 degrees;

(3) A maximum righting arm that occurs at an angle of heel not less than 25 degrees;

(4) An area under each righting arm curve of at least 10.3 foot-degrees (3.15

meter-degrees) up to an angle of heel of 30 degrees;

(5) An area under each righting arm curve of at least 16.9 foot-degrees (5.15 meter-degrees) up to an angle of heel of 40 degrees or the downflooding angle, whichever is less; and

(6) An area under each righting arm curve between the angles of 30 degrees and 40 degrees, or between 30 degrees and the downflooding angle if this angle is less than 40 degrees, of not less than 5.6 foot-degrees (1.72 meter-degrees).

(c) Each vessel must have—

(1) An initial metacentric height (GM) of at least 0.49 feet (0.15 meters);

(2) A maximum righting arm that occurs at an angle of heel not less than 15 degrees;

(3) An area under each righting arm curve of at least 16.9 foot-degrees (5.15 meter-degrees) up to an angle of heel of 40 degrees or the downflooding angle, whichever is less;

(4) An area under each righting arm curve between the angles of 30 degrees and 40 degrees, or between 30 degrees and the downflooding angle if this angle is less than 40 degrees, of not less than 5.6 foot-degrees (1.72 meter-degrees); and

(5) An area under each righting arm curve up to the angle of maximum righting arm of not less than the area determined by the following equation:

$$A = 10.3 + 0.187 (30 - Y) \text{ foot-degrees}$$

$$A = 3.15 + 0.057 (30 - Y) \text{ meter-degrees}$$

where—

A=area in foot-degrees (meter-degrees).

Y=angle of maximum righting arm, degrees.

(d) For the purpose of demonstrating compliance with paragraphs (b) and (c) of this section, at each angle of heel a vessel's righting arm is calculated after the vessel is permitted to trim free until the trimming moment is zero.

(e) For the purpose of demonstrating acceptable stability on the vessels described in § 170.170(d) as having unusual proportion and form, compliance with paragraphs (a) through (d) of this section or the following criteria is required:

(1) For partially protected routes, there must be—

- (i) Positive righting arms to at least 35 degrees of heel;
- (ii) No down flooding point to at least 20 degrees; and
- (iii) At least 15 foot-degrees of energy to the smallest of the following angles:
 - (A) Angle of maximum righting arm.
 - (B) Angle of down flooding.
 - (C) 40 degrees.

(2) For protected routes, there must be—

- (i) Positive righting arms to at least 25 degrees of heel;
- (ii) No down flooding point to at least 15 degrees; and
- (iii) At least 10 foot-degrees of energy to the smallest of the following angles:
 - (A) Angle of maximum righting arm.
 - (B) Angle of down flooding.
 - (C) 40 degrees.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 944, Jan. 10, 1996; CGD 95-028, 62 FR 51218, Sept. 30, 1997; CGD 85-080, 62 FR 51353, Sept. 30, 1997]

Subpart F—Determination of Lightweight Displacement and Centers of Gravity

§ 170.174 Specific applicability.

This subpart applies to each vessel for which the lightweight displacement and centers of gravity must be determined in order to do the calculations required in this subchapter.

§ 170.175 Stability test: General.

(a) Except as provided in paragraphs (c) and (d) of this section and in § 170.200, the owner of a vessel must conduct a stability test of the vessel and calculate its vertical and longitudinal centers of gravity and its lightweight displacement.

(b) An authorized Coast Guard or ABS representative must be present at each stability test conducted under this section.

(c) The stability test may be dispensed with, or a deadweight survey may be substituted for the stability test, if the Coast Guard or the ABS has a record of, or is provided with, the approved results of a stability test of a sister vessel.

(d) The stability test of a vessel may be dispensed with if the Coast Guard or

the ABS determines that an accurate estimate of the vessel's lightweight characteristics can be made and that locating the precise position of the vessel's vertical center of gravity is not necessary to ensure that the vessel has adequate stability in all probable loading conditions.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 95-028, 62 FR 51218, Sept. 30, 1997; USCG 1998-4442, 63 FR 52192, Sept. 30, 1998]

§ 170.180 Plans and information required at the stability test.

The owner of a vessel must provide the following Coast Guard or ABS approved plans and information to the authorized Coast Guard or ABS representative at the time of the stability test:

- (a) Lines.
- (b) Curves of form.
- (c) Capacity plans showing capacities and vertical and longitudinal centers of gravity of stowage spaces and tanks.
- (d) Tank sounding tables.
- (e) Draft mark locations.
- (f) General arrangement plan of decks, holds, and inner bottoms.
- (g) Inboard and outboard profiles.
- (h) The stability test procedure described in § 170.185(g).

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 95-028, 62 FR 51218, Sept. 30, 1997]

§ 170.185 Stability test preparations.

The following preparations must be made before conducting a stability test:

(a) The vessel must be as complete as practicable at the time of the test.

(b) Each tank vessel must be empty and dry, except that a tank may be partially filled or full if the Coast Guard Marine Safety Center or the ABS determines that empty and dry tanks are impracticable and that the effect of filling or partial filling on the location of the center of gravity and on the displacement can be accurately determined.

(c) All dunnage, tools, and other items extraneous to the vessel must be removed.

(d) The water depth at the mooring site must provide ample clearance against grounding.

(e) Each mooring line must be arranged so that it does not interfere with the inclination of the unit during the test.

(f) The draft and axis of rotation selected for testing a mobile offshore drilling unit must be those that result in acceptable accuracy in calculating the center of gravity and displacement of the unit.

(g) The stability test procedure required by § 170.085 must include the following:

- (1) Identification of the vessel to be tested.
- (2) Date and location of the test.
- (3) Inclining weight data.
- (4) Pendulum locations and lengths.
- (5) Approximate draft and trim of the vessel.
- (6) Condition of each tank.
- (7) Estimated items to be installed, removed, or relocated after the test, including the weight and location of each item.
- (8) Schedule of events.
- (9) Person or persons responsible for conducting the test.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988; CGD 95-028, 62 FR 51218, Sept. 30, 1997]

§ 170.190 Stability test procedure modifications.

The authorized Coast Guard or ABS representative present at a stability test may allow a deviation from the requirements of §§ 170.180 and 170.185 if the representative determines that the deviation would not decrease the accuracy of the test results.

[CGD 95-028, 62 FR 51218, Sept. 30, 1997]

§ 170.200 Estimated lightweight vertical center of gravity.

(a) Each tank vessel that does not carry a material listed in either Table 1 of part 153 or Table 4 of part 154 of this chapter may comply with this section in lieu of § 170.175 if it—

- (1) Is 150 gross tons or greater;
- (2) Is of ordinary proportions and form;
- (3) Has a flush weather deck, one or more longitudinal bulkheads, and no independent tanks; and
- (4) Is designed not to carry cargo above the freeboard deck.

(b) When doing the calculations required by §§ 170.170 and 172.065, the vertical center of gravity of a tank vessel in the lightweight condition must be assumed to be equal to the following percentage of the molded depth of the vessel measured from the keel amidship:

- (1) For a tank ship—70%.
- (2) For a tank barge—60%.

(c) As used in this section, *molded depth* has the same meaning that is provided for the term in § 42.13-15(e) of this chapter.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 944, Jan. 10, 1996]

Subpart G—Special Installations

§ 170.235 Fixed ballast.

- (a) Fixed ballast, if used, must be—
 - (1) Installed under the supervision of the OCMI; and
 - (2) Stowed in a manner that prevents shifting of position.
- (b) Fixed ballast may not be removed from a vessel or relocated unless approved by the Coast Guard Marine Safety Center or the ABS. However, ballast may be temporarily moved for vessel examination or repair if done under the supervision of the OCMI.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988; CGD 95-028, 62 FR 51218, Sept. 30, 1997]

§ 170.245 Foam flotation material.

- (a) Installation of foam must be approved by the OCMI.
- (b) If foam is used to comply with § 171.070(d), § 171.095(c), or § 173.063(e) of this subchapter, the following applies:
 - (1) Foam may be installed only in void spaces that are free of ignition sources.
 - (2) The foam must comply with MIL-P-21929B including the requirements for fire resistance.
 - (3) A submergence test must be conducted for a period of at least 7 days to demonstrate whether the foam has adequate strength to withstand a hydrostatic head equivalent to that which would be imposed if the vessel were submerged to its margin line.
 - (4) The effective buoyancy at the end of the submergence test must be used

as the buoyancy credit; however, in no case will a credit greater than 55 lbs per cubic foot (881 kilograms per cubic meter) be allowed.

(5) The structure enclosing the foam must be strong enough to accommodate the buoyancy of the foam.

(6) Piping and cables must not pass through foamed spaces unless they are within piping and cable trunks accessible from both ends.

(7) Sample specimens must be prepared during installation and the density of the installed foam must be determined.

(8) Foam may be installed adjacent to fuel tanks if the boundary between the tank and space has double continuous fillet welds.

(9) MIL-P-21929B is incorporated by reference into this part.

(10) The results of all tests and calculations must be submitted to the OCMI.

(11) Blocked foam must—

(i) Be used in each area that may be exposed to water; and

(ii) Have a protective cover approved by the OCMI.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 83-005, 51 FR 923, Jan. 9, 1986]

Subpart H—Watertight Bulkhead Doors

§ 170.248 Applicability.

(a) Except as provided in paragraph (b) or paragraph (c) of this section, this subpart applies to vessels with watertight doors in bulkheads that have been made watertight to comply with the flooding or damage stability regulations in this subchapter.

(b) A watertight door on a MODU must comply with § 174.100 of this subchapter.

(c) A watertight door on a self-propelled hopper dredge with a working freeboard must comply with § 174.335 of this subchapter.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 76-080, 54 FR 36977, Sept. 6, 1989]

§ 170.250 Types and classes.

(a) Watertight doors, except doors between cargo spaces, are classed as follows:

(1) Class 1—Hinged door.

(2) Class 2—Sliding door, operated by hand gear only.

(3) Class 3—Sliding door, operated by power and by hand gear.

(b) The following types of watertight doors are not permitted:

(1) A plate door secured only by bolts; and

(2) A door required to be closed by dropping or by the action of dropping weights.

(c) Whenever a door of a particular class is prescribed by these regulations, a door of a class bearing a higher number may be used.

§ 170.255 Class 1 doors; permissible locations.

(a) Except as provided in paragraphs (b) and (c) of this section, Class 1 doors within passenger, crew, and working spaces are permitted only above a deck, the molded line of which, at its lowest point at side, is at least 7 feet (2.14 meters) above the deepest load line.

(b) Class 1 doors are permitted within passenger, crew, and working spaces, wherever located, if—

(1) In the judgment of the OCMI, the door is in a location where it will be closed at all times except when actually in use; and

(2) The vessel is less than 150 gross tons and will not proceed more than 20 nautical miles (37 kilometers) from shore; or

(3) The vessel is in rivers or lakes, bays, and sounds service.

(c) Class 1 doors are permitted in any location on a vessel that—

(1) Is less than 100 gross tons; and

(2) Will operate only in the offshore oil industry trade.

(d) Quick-acting Class 1 doors are permitted in any location on a vessel that operates on the Great Lakes and is required to meet the damage stability standards of subpart H of part 172 of this chapter.

(e) For vessels required to meet the damage stability standards of subpart H of this chapter, when Class 1 doors are installed below a deck the molded

line of which at its lowest point at side is less than 7 feet (2.14 meters) above the deepest load line, an indicator light for each door which warns when the door is open must be installed on the bridge.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 80-159, 51 FR 33059, Sept. 18, 1986]

§ 170.260 Class 2 doors; permissible locations.

(a) Except as provided in paragraphs (b) and (c) of this section, a Class 2 door is permitted only if—

(1) Its sill is above the deepest load line; and

(2) It is not a door described in § 170.265(d).

(b) If passenger spaces are located below the bulkhead deck, Class 2 doors with sills below the deepest load line may be used if—

(1) The number of watertight doors located below the deepest load line that are used intermittently during operation of the vessel does not exceed two, and;

(2) The doors provide access to or are within spaces containing machinery.

(c) If no passenger spaces are located below the bulkhead deck, Class 2 doors may be used if the number of watertight doors located below the deepest load line that are used intermittently during operation of the vessel does not exceed five.

(d) In determining whether Class 2 doors are allowed under paragraph (c) of this section, the watertight doors at the entrance to shaft tunnels need not be counted. If Class 2 doors are allowed under paragraph (c) of this section, the doors at the entrance to shaft tunnels may also be Class 2.

§ 170.265 Class 3 doors; required locations.

The following doors must always be Class 3:

(a) Doors in all locations not addressed in §§ 170.255 and 170.260.

(b) Doors between coal bunkers below the bulkhead deck that must be opened at sea.

(c) Doors into trunkways that pass through more than one main transverse watertight bulkhead if the door

sills are less than 2.14 meters above the deepest load line.

(d) Doors below a deck, the molded line of which, at its lowest point at side, is less than 2.14 meters (7 feet) above the deepest load line if—

(1) The vessel is engaged on a short international voyage as defined in § 171.010 of this subchapter; and

(2) The vessel is required by § 171.065 of this subchapter to have a factor of subdivision of 0.5 or less.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 944, Jan. 10, 1996; CGD 96-041, 61 FR 50734, Sept. 27, 1996]

§ 170.270 Door design, operation, installation, and testing.

(a) Each Class 1 door must have a quick action closing device operative from both sides of the door.

(b) Each Class 1 door on a vessel in ocean service must be designed to withstand a head of water equivalent to the depth from the sill of the door to the margin line but in no case less than 10 feet (3.05 meters).

(c) Each Class 2 and Class 3 door must—

(1) Be designed, constructed, tested, and marked in accordance with ASTM F-1196;

(2) Have controls in accordance with ASTM F-1197; and

(3) If installed in a subdivision bulkhead, meet Supplemental Requirements Nos. S1 and S3 of ASTM F-1196, unless the watertight doors are built in accordance with plans previously approved by the Coast Guard, in which case, only Supplemental Requirements Nos. S1 and S3.1.4 of ASTM F-1196 must be met. In either case, control systems for watertight doors must have power supplies, power sources, installation tests and inspection, and additional remote operating consoles in accordance with Supplemental Requirements Nos. S1 through S4 of ASTM F-1197.

(d) Installations of sliding watertight door assemblies must be in accordance with the following:

(1) Before a sliding watertight door assembly is installed in a vessel, the bulkhead in the vicinity of the door opening must be stiffened. Such bulkhead stiffeners, or deck reinforcement where flush deck door openings are desired, must not be less than 6 inches

§ 170.275

nor more than 12 inches from the door frame so that an unstiffened diaphragm of bulkhead plating 6 to 12 inches wide is provided completely around the door frame. Where such limits cannot be maintained, alternative installations will be considered by the Marine Safety Center. In determining the scantlings of these bulkhead stiffeners, the door frame should not be considered as contributing to the strength of the bulkhead. Provision must also be made to adequately support the thrust bearings and other equipment that may be mounted on the bulkhead or deck.

(2) Sliding watertight door frames must be either bolted or welded watertight to the bulkhead.

(i) If bolted, a suitable thin heat and fire resistant gasket or suitable compound must be used between the bulkhead and the frame for watertightness. The bulkhead plating must be worked to a plane surface in way of the frame when mounting.

(ii) If welded, caution must be exercised in the welding process so that the door frame is not distorted.

(e) For each watertight door which is in a required subdivision bulkhead, an indicator light must be installed in the pilothouse and at each other vessel operating station from which the door is not visible. The indicator must show whether the door is open or closed.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 88-032, 56 FR 35828, July 29, 1991; CGD 85-080, 61 FR 944, Jan. 10, 1996]

§ 170.275 Special requirements for cargo space watertight doors.

(a) A door between cargo spaces—

(1) Must not be designed for remote operation;

(2) Must be located as high as practicable; and

(3) Must be located as far inboard of the side shell as practicable but in no case closer to the side shell than one-fifth of the beam of the vessel where the beam is measured at right angles to the centerline of the vessel at the level of the deepest load line.

(b) If the door is accessible while the ship is in operation, it must have installed a lock or other device that prevents unauthorized opening.

46 CFR Ch. I (10-1-98 Edition)

(c) Before installing a watertight door in a cargo space, approval must be obtained from the Commanding Officer, Marine Safety Center.

[CGD 79-023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

Subpart I—Free Surface

§ 170.285 Free surface correction for intact stability calculations.

(a) When doing the intact stability calculations required by this subchapter, the virtual increase in the vessel's vertical center of gravity due to liquids in tanks must be determined by calculating—

(1) For each type of consumable liquid, the maximum free surface effect of at least one transverse pair of wing tanks or a single centerline tank; and

(2) The maximum free surface effect of each partially filled tank containing non-consumable liquids.

(b) For the purpose of paragraph (a)(1) of this section, the tank or combination of tanks selected must be those having the greatest free surface effect.

§ 170.290 Free surface correction for damage stability calculations.

(a) When doing the damage stability calculations required by this subchapter, the virtual increase in the vessel's vertical center of gravity due to liquids in tanks must be determined by calculating—

(1) For each type of consumable liquid, the free surface effect of at least one transverse pair of wing tanks or a single centerline tank; and

(2) The free surface effect of each partially filled tank containing other than consumable liquids.

(b) For the purpose of paragraph (a)(1) of this section, the tank or combination of tanks selected must be those having the greatest free surface effect.

(c) When doing the calculations in paragraph (a) of this section, the free surface effect of a liquid in a tank must be determined by—

(1) Assuming the vessel is heeled five degrees from the vertical; or

(2) Calculating the shift of the center of gravity of the liquid in the tank by the moment of transference method.

§ 170.295 Special consideration for free surface of passive roll stabilization tanks.

(a) The virtual increase in the vertical center of gravity due to a liquid in a roll stabilization tank may be calculated in accordance with paragraph (b) of this section if—

(1) The virtual increase in the vertical center of gravity of the vessel is calculated in accordance with § 170.285(a); and

(2) The slack surface in the roll stabilization tank is reduced during vessel motions because of the shape of the tank or the amount of liquid in the tank.

(b) The virtual rise in the vertical center of gravity calculated in accordance with § 170.285(a) for a stabilization tank may be reduced in accordance with the following equation:

$$E.F.S. = (K)(F.F.S.)$$

where—

E.F.S. = the effective free surface.

F.F.S. = the full free surface calculated in accordance with § 170.285(a).

K = the reduction factor calculated in accordance with paragraph (c) of this section.

(c) The factor (K) must be calculated as follows:

(1) Plot $(I/d)\tan T$ on Graph 170.295 where—

(i) (I) is the moment of inertia of the free surface in the roll tank;

(ii) (d) is the density of the liquid in the roll tank; and

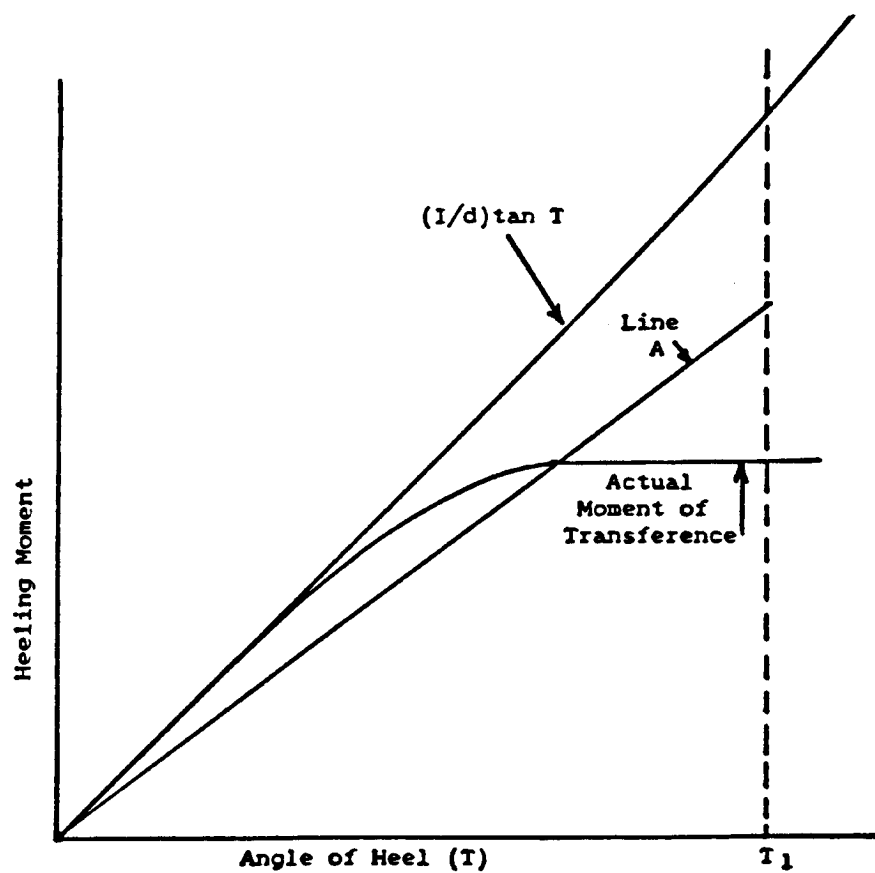
(iii) (T) is the angle of heel.

(2) Plot the moments of transference of the liquid in the roll tank on Graph 170.295.

(3) Construct a line A on Graph 170.295 so that the area under line A between $T = 0$ and the angle at which the deck edge is immersed or 28 degrees, whichever is smaller, is equal to the area under the curve of actual moments of transference between the same angles.

(4) The factor (K) is calculated by determining the ratio of the ordinate of line A to the ordinate of the curve of $(I/d)\tan T$, both measured at the angle at which the deck edge is immersed or 28 degrees, whichever is smaller.

GRAPH 170.295
Special Free Surface Correction
for
Stabilization Tanks



T_1 = the angle at which the deck edge is immersed or 28 degrees, whichever is smaller.

§ 170.300 Special consideration for free surface of spoil in hopper dredge hoppers.

The calculations required by this subchapter for each self-propelled hopper dredge must include—

(a) The free surface effect of consumable liquids and the free surface effect of the dredged spoil in the hoppers; and

(b) Either of the following assumptions when performing the calculations required by § 174.310(b) of this chapter:

(1) If the dredged spoil is assumed to be jettisoned, the free surface of the dredged spoil may be disregarded.

(2) If the dredged spoil is not assumed to be jettisoned, the free surface of the dredged spoil must be calculated.

[CGD 76-080, 54 FR 36977, Sept. 6, 1989]

PART 171—SPECIAL RULES PERTAINING TO VESSELS CARRYING PASSENGERS

Subpart A—General

Sec.

171.001 Applicability.

171.010 Definitions.

171.015 Location of margin line.

171.017 One and two compartment standards of flooding.

Subpart B [Reserved]

Subpart C—Large Vessels

171.045 Specific applicability.

171.050 Intact stability requirements for a mechanically propelled or a nonself-propelled vessel.

171.055 Intact stability requirements for a monohull sailing vessel or a monohull auxiliary sailing vessel.

171.057 Intact stability requirements for a sailing catamaran.

171.060 Watertight subdivision: General.

171.065 Subdivision requirements—Type I.

171.066 Calculation of permeability for Type I subdivision.

171.067 Treatment of stepped and recessed bulkheads in Type I subdivision.

171.068 Special considerations for Type I subdivision for vessels on short international voyages.

171.070 Subdivision requirements—Type II.

171.072 Calculation of permeability for Type II subdivision.

171.073 Treatment of stepped and recessed bulkheads in Type II subdivision.

171.075 Subdivision requirements—Type III.

171.080 Damage stability standards for vessels with Type I or Type II subdivision.

171.082 Damage stability standards for vessels with Type III subdivision.

Subpart D—Additional Subdivision Requirements

171.085 Collision bulkhead.

171.090 Aft peak bulkhead.

171.095 Machinery space bulkhead.

171.100 Shaft tunnels and stern tubes.

171.105 Double bottoms.

171.106 Wells in double bottoms.

171.108 Manholes in double bottoms.

171.109 Watertight floors in double bottoms.

Subpart E—Penetrations and Openings in Watertight Bulkheads

171.110 Specific applicability.

171.111 Penetrations and openings in watertight bulkheads in vessels of 100 gross tons or more.

171.112 Watertight door openings.

171.113 Trunks.

171.114 Penetrations and openings in watertight bulkheads in a vessel less than a 100 gross tons.

Subpart F—Openings in the Side of a Vessel Below the Bulkhead or Weather Deck

171.115 Specific applicability.

171.116 Port lights.

171.117 Dead covers.

171.118 Automatic ventilators and side ports.

171.119 Openings below the weather deck in the side of a vessel less than 100 gross tons.

Subpart G—Watertight Integrity Above the Margin Line

171.120 Specific applicability.

171.122 Watertight integrity above the margin line in a vessel of 100 gross tons or more.

171.124 Watertight integrity above the margin line in a vessel less than 100 gross tons.

Subpart H—Drainage of Weather Decks

171.130 Specific applicability.

171.135 Weather deck drainage on a vessel of 100 gross tons or more.

171.140 Drainage of a flush deck vessel.

171.145 Drainage of a vessel with a cockpit.

171.150 Drainage of a vessel with a well deck.

171.155 Drainage of an open boat.

AUTHORITY: 46 U.S.C. 2103, 3306; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

SOURCE: CGD 79–023, 48 FR 51017, Nov. 4, 1983, unless otherwise noted.

Subpart A—General

§ 171.001 Applicability.

(a) This part applies to passenger vessels inspected under subchapter K or H of this chapter.

(b) Specific sections of this part also apply to nautical school ships, sailing school vessels and oceanographic vessels. The applicable sections are listed in subparts C and D of part 173 of this chapter.

[CGD 79–023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 83–005, 51 FR 923, Jan. 9, 1986; CGD 95–012, 60 FR 48052, Sept. 18, 1995; 60 FR 50120, Sept. 28, 1995; CGD 85–080, 61 FR 944, Jan. 10, 1996]

§ 171.010 Definitions.

(a) *Cockpit* means an exposed recess in the weather deck extending no more than one-half of the vessel's length over deck (LOD) measured over the weather deck.

(b) *Deepest subdivision load line* means the waterline that corresponds to the deepest draft permitted by the applicable subdivision requirements in this part.

(c) *Equivalent plane bulkhead* means a bulkhead that is—

(1) Used in lieu of a recessed or stepped bulkhead when doing the subdivision calculations required in this part; and

(2) Located as shown in Figure 171.010(a).

(d) *Ferry* means a vessel that—

(1) Operates in other than ocean or coastwise service;

(2) Has provisions only for deck passengers or vehicles, or both;

(3) Operates on a short run on a frequent schedule between two points over the most direct water route;

(4) Offers a public service of a type normally attributed to a bridge or tunnel.

(e) *Freeing port* means any direct opening through the vessel's bulwark or hull to quickly drain overboard water which has been shipped on exposed decks.

(f) *Floodable length* means the length of a shell to shell segment of the vessel that, when flooded, will sink and trim

the vessel until the margin line is tangent to the waterline.

(g) *Flush deck* means a continuous weather deck located at the uppermost sheer line of the hull.

(h) *International voyage* has the same meaning provided for the term in § 70.05–10 of this chapter.

(i) *Machinery space* means, unless otherwise prescribed by the Commandant for unusual arrangements, the space extending from the molded base line to the margin line and between the main transverse watertight bulkheads bounding the following spaces:

(1) Each space containing main and auxiliary propelling machinery.

(2) Each space containing propulsion boilers.

(3) Each space containing permanent coal bunkers.

(j) *Open boat* means a vessel not protected from entry of water by means of a complete deck, or by a combination of a partial weather deck and superstructure which is seaworthy for the waters upon which the vessel operates.

(k) *Passenger space* means a space which is provided for the accommodation and use of passengers, other than a baggage, store, provision or mail room.

(l) *Recessed bulkhead* means a bulkhead that is recessed as shown by bulkhead B in Figure 171.010(b).

(m) *Small passenger vessel* means a vessel of less than 100 gross tons—

(1) Carrying more than 6 passengers, including at least one passenger for hire;

(2) That is chartered with the crew provided or specified by the owner or owner's representative and carrying more than 6 passengers;

(3) That is chartered with no crew provided or specified by the owner or owner's representative and carrying more than 12 passengers; or

(4) That is a submersible vessel carrying at least one passenger for hire.

(n) *Short international voyage* means an international voyage where—

(1) A vessel is not more than 200 nautical miles (370 kilometers) from a port or place in which the passengers and crew could be placed in safety; and

(2) The total distance between the last port of call in the country in

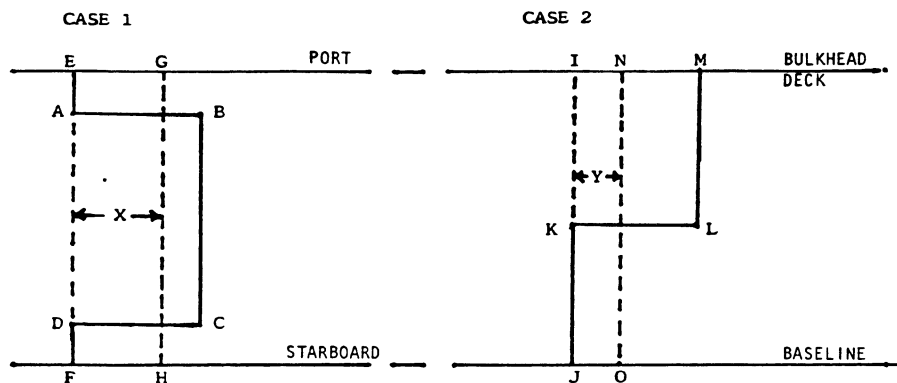
which the voyage began and the final port of destination does not exceed 600 nautical miles (1111 kilometers).

(o) *Scupper* means a pipe or tube of at least 30 millimeters (1.25 inches) in diameter leading down from a deck or

sole and through the hull to drain water overboard.

(p) *Stepped bulkhead* means a bulkhead that is stepped as shown by bulkhead A in Figure 171.010(b).

Figure 171.010(a)



Case 1: $X = V/A$
where-

X = Distance between EF and the equivalent plane bulkhead GH.

V = Volume of the space directly below ABCD and extending to the shell.

A = Sectional area midway between EF and GH.

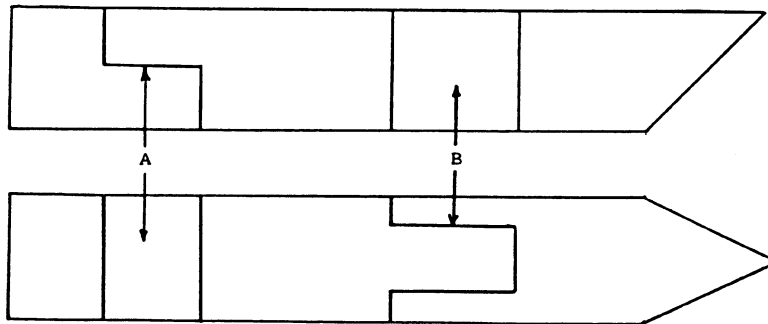
Case 2: $Y = V/A$
where-

Y = Distance between IJ and the equivalent plane bulkhead NO.

V = Volume of the space directly below IKLM and extending to the shell.

A = Sectional area midway between IJ and NO.

Figure 171.010(b)



(q) *Well deck* means a weather deck fitted with solid bulwarks that impede the drainage of water over the sides or an exposed recess in the weather deck extending one-half or more of the length of the vessel (LOD) measured over the weather deck.

[CGD 79–023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 85–080, 61 FR 944, Jan. 10, 1996]

§ 171.015 Location of margin line.

(a) *A vessel with a continuous bulkhead deck and sufficient sheer.* If the average value of the sheer at the forward per-

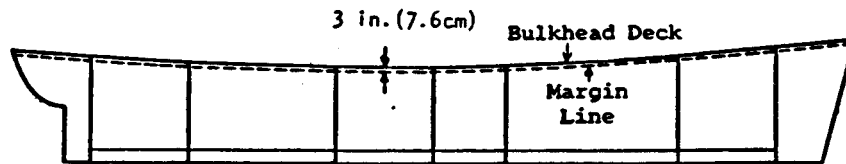
pendicular (FP) and the after perpendicular (AP) is at least 12 inches (30.5 cm), the margin line must be located no less than 3 inches (7.6 cm) below the upper surface of the bulkhead deck at side as illustrated in Figure 171.015(a).

TABLE 171.015

Average value of sheer at FP and AP in inches (cm)	Required position of margin line below top of deck amidships in inches (cm)
12 (30.5)	3 (7.6)
6 (15.2)	6 (15.2)
0	9 (22.8)

Figure 171.015(a)

Margin Line for a Vessel With a Continuous Bulkhead Deck and With an Average Value of Sheer at the FP and AP of at Least 12 Inches (30.5 cm)



(b) *A vessel with a continuous bulkhead deck and insufficient sheer.* If the average value of the sheer at the forward perpendicular (FP) and the after perpendicular (AP) is less than 12 inches (30.5 cm), the margin line must be a parabolic curve with the following characteristics:

(1) The parabolic curve must be at least 3 inches (7.6 cm) below the upper

surface of the bulkhead deck at the FP and AP.

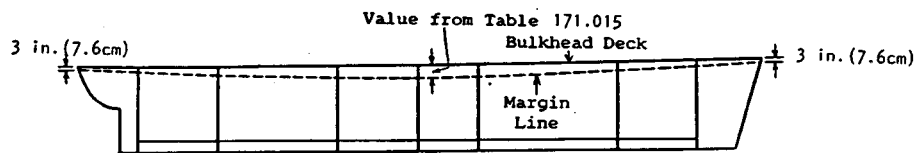
(2) The parabolic curve must be at least the distance given in Table 171.015 below the surface of the bulkhead deck amidships.

(3) Intermediate values not shown in Table 171.015 must be interpolated.

(4) Figure 171.015(b) illustrates a margin line drawn in this manner.

Figure 171.015(b)

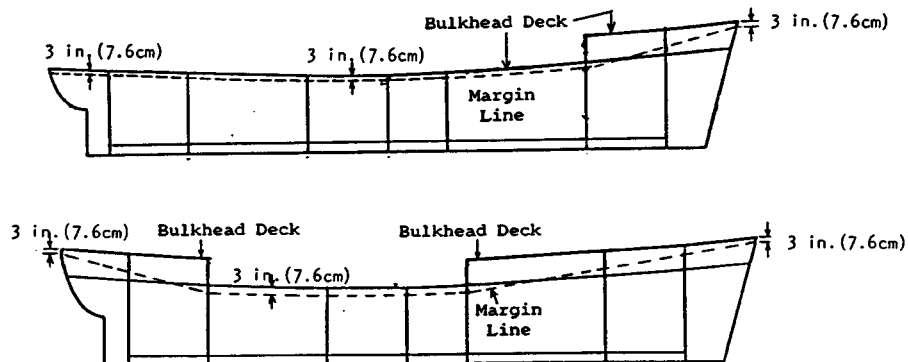
Margin Line for a Vessel With a Continuous Bulkhead Deck
and With an Average Value of Sheer at the FP and AP Less
Than 12 Inches (30.5 cm)



(c) A vessel with a discontinuous bulkhead deck. A continuous margin line must be drawn that is no more than 3 inches (7.6 cm) below the upper surface of the bulkhead deck at side as illustrated in Figure 171.015(c).

Figure 171.015(c)

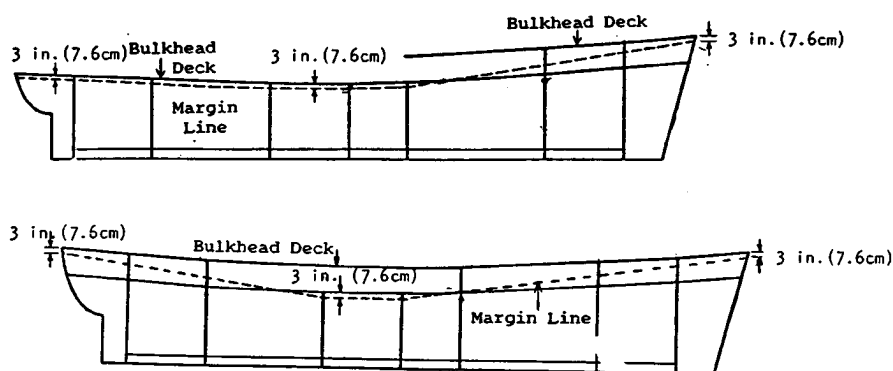
Margin Line for a Vessel With a Discontinuous Bulkhead Deck



(d) A vessel with a discontinuous bulkhead deck where the side shell is carried watertight to a higher deck. A continuous margin line must be drawn as illustrated in Figure 171.015(d).

Figure 171.015(d)

**Margin Line for a Vessel With a Discontinuous
Bulkhead Deck and With Side Shell Watertight to a Higher Deck**



§ 171.017 One and two compartment standards of flooding.

(a) *One compartment standard of flooding.* A vessel is designed to a one compartment standard of flooding if the margin line is not submerged when the total buoyancy between each set of two adjacent main transverse watertight bulkheads is lost.

(b) *Two compartment standard of flooding.* A vessel is designed to a two compartment standard of flooding if the margin line is not submerged when the total buoyancy between each set of three adjacent main transverse watertight bulkheads is lost.

Subpart B [Reserved]

Subpart C—Large Vessels

§ 171.045 Specific applicability.

This subpart applies to each vessel that fits into any one of the following categories:

- (a) Greater than 100 gross tons.
- (b) Greater than 65 feet (19.8 meters) in length.
- (c) Carries more than 12 passengers on an international voyage.
- (d) Carries more than 150 passengers.
- (e) The stability of which is questioned by the OCMI.

§ 171.050 Intact stability requirements for a mechanically propelled or a nonself-propelled vessel.

Each vessel must be shown by design calculations to have a metacentric height (GM) in feet (meters) in each condition of loading and operation, that is not less than the value given by the following equation:

$$GM = \frac{Nb}{(K)(W)(\tan(T))}$$

where—

N=number of passengers.

W=displacement of the vessel in long (metric) tons.

T=14 degrees or the angle of heel at which the deck edge is first submerged, whichever is less.

b=distance in feet (meters) from the centerline of the vessel to the geometric center of the passenger deck on one side of the centerline.

K=24 passengers/long ton (23.6 passengers/metric ton).

§ 171.055 Intact stability requirements for a monohull sailing vessel or a monohull auxiliary sailing vessel.

- (a) Except as specified in paragraph
- (b) of this section, each monohull sailing vessel and auxiliary sailing vessel must be shown by design calculations to meet the stability requirements in this section.

Coast Guard, DOT

§ 171.055

(b) Additional or different stability requirements may be needed for a vessel of unusual form, proportion, or rig. The additional requirements, if needed, will be prescribed by the Commandant.

(c) Each vessel must have positive righting arms in each condition of loading and operation from—

(1) 0 to at least 70 degrees of heel for service on protected or partially protected waters; and

(2) 0 to at least 90 degrees of heel for service on exposed waters.

(d) Each vessel must be designed to satisfy the following equations:

(1) For a vessel in service on protected or partially protected waters—

$$\frac{1000(W)HZA}{(A)(H)} \geq X$$

$$\frac{1000(W)HZB}{(A)(H)} \geq Y$$

$$\frac{1000(W)HZC}{(A)(H)} \geq Z$$

where—

X=1.0 long tons/sq. ft. (10.9 metric tons/sq. meter).

Y=1.1 long tons/sq. ft. (12.0 metric tons/sq. meter).

Z=1.25 long tons/sq. ft. (13.7 metric tons/sq. meter).

(2) For a vessel on exposed waters—

$$\frac{1000(W)HZA}{(A)(H)} \geq X$$

$$\frac{1000(W)HZB}{(A)(H)} \geq Y$$

$$\frac{1000(W)HZC}{(A)(H)} \geq Z$$

where—

HZA, HZB, and HZC are calculated in the manner specified in paragraph (e) or (f) of this section.

X=1.5 long tons/sq. ft. (16.4 metric tons/sq. meter).

Y=1.7 long tons/sq. ft. (18.6 metric tons/sq. meter).

Z=1.9 long tons/sq. ft. (20.8 metric tons/sq. meter).

A=the projected lateral area or silhouette in square feet (meters) of the portion of the vessel above the waterline computed with all sail set and trimmed flat. Sail overlap areas need not be included except parachute type spinnakers which are to be added regardless of overlap.

H=the vertical distance in feet (meters) from the center of A to the center of the underwater lateral area or approximately to the one-half draft point.

W=the displacement of the vessel in long (metric) tons.

(e) Except as provided in paragraph (f) of this section, HZA, HZB, and HZC must be determined as follows for each condition of loading and operation:

(1) Plot the righting arm curve on Graphs 171.055 (b), (c), and (d) or (e).

(2) If the angle at which the maximum righting arm occurs is less than 35 degrees, the righting arm curve must be truncated as shown on Graph 171.055(a).

(3) Plot an assumed heeling arm curve on Graph 171.055(b) that satisfies the following conditions:

(i) The assumed heeling arm curve must be defined by the equation—

$$HZ=HZA \cos^2 (T)$$

where—

HZ=heeling arm.

HZA=heeling arm at 0 degrees of heel.

T=angle of heel.

(ii) The first intercept shown on Graph 171.055(b) must occur at the angle of heel corresponding to the angle at which deck edge immersion first occurs.

(4) Plot an assumed heeling arm curve on Graph 171.055(c) that satisfies the following conditions:

(i) The assumed heeling arm curve must be defined by the equation—

$$HZ=HZB \cos^2 (T)$$

where—

HZ=heeling arm.

HZB=heeling arm at 0 degrees of heel.

T=angle of heel.

(ii) The area under the assumed heeling arm curve between 0 degrees and

§ 171.055

46 CFR Ch. I (10–1–98 Edition)

the downflooding angle or 60 degrees, whichever is less, must be equal to the area under the righting arm curve between the same limiting angles.

(5) Plot an assumed heeling arm curve on Graph 171.055 (d) or (e) that satisfies the following conditions:

(i) The assumed heeling arm curve must be defined by—

$$\leq HZ = HZC \cos^2 (T)$$

where—

HZ=heeling arm.

HZC=heeling arm at 0 degrees of heel.

T=angle of heel.

(ii) The area under the assumed heeling arm curve between the angles of 0 and 90 degrees must be equal to the area under the righting arm curve between 0 degrees and—

(A) 90 degrees if the righting arms are positive to an angle less than or equal to 90 degrees; or

(B) The largest angle corresponding to a positive righting arm but no more than 120 degrees if the righting arms are positive to an angle greater than 90 degrees.

(6) The values of HZA, HZB, and HZC are read directly from Graphs 171.055 (b), (c), and (d) or (e).

(f) For the purpose of this section, the downflooding angle means the static angle from the intersection of the vessel's centerline and waterline in calm water to the first opening that cannot be rapidly closed watertight.

(g) HZB and, if the righting arms are positive to an angle of 90 degrees or greater, HZC may be computed from the following equation:

$$HZB \text{ (or HZC)} = \frac{I}{((T / 2) + 14.3 \sin 2T)}$$

where—

I=the area under the righting arm curve to—

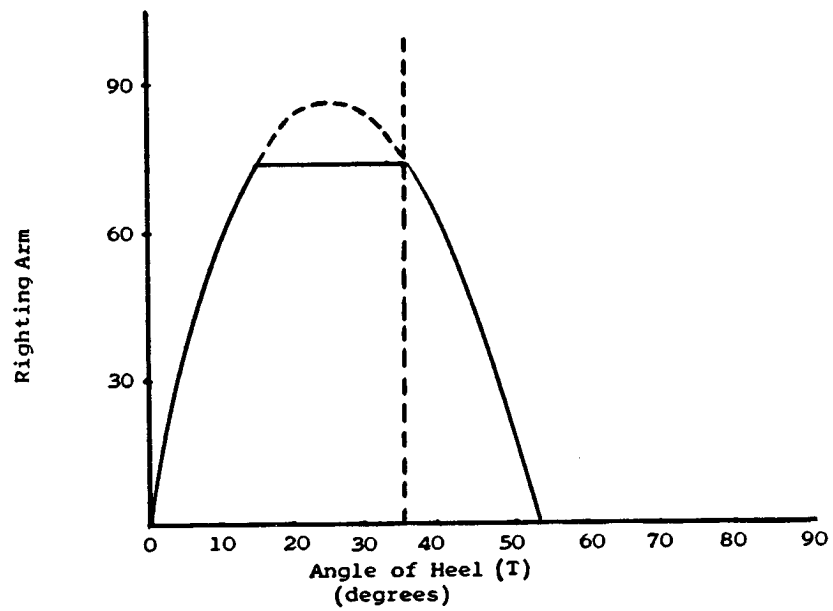
(1) the downflooding angle or 60 degrees, whichever is less, when computing HZB; or

(2) the largest angle corresponding to a positive righting arm or 90 degrees, whichever is greater, but no greater than 120 degrees when computing HZC.

T=the downflooding angle or 60 degrees, whichever is less, when computing HZB or 90 degrees when computing HZC.

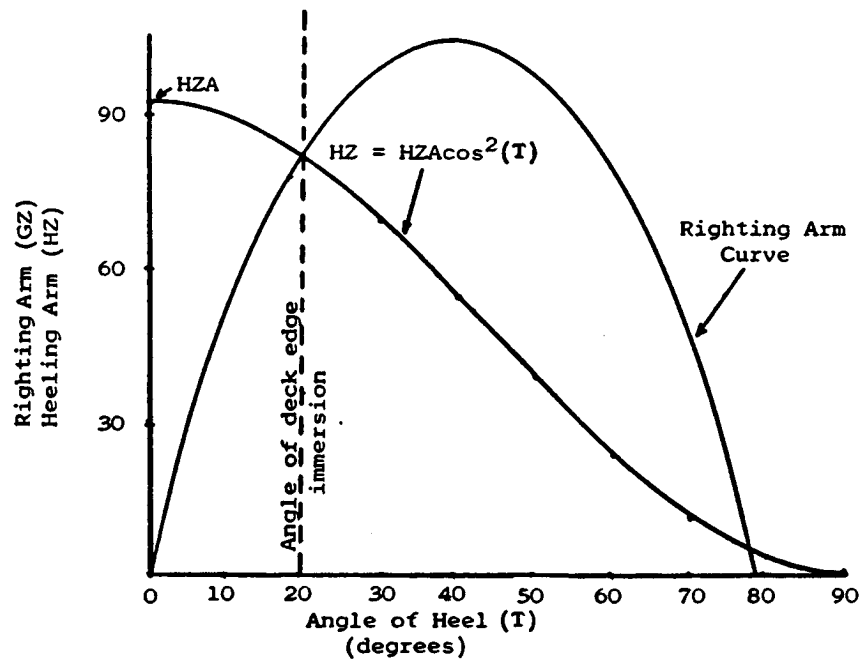
GRAPH 171.055(a)

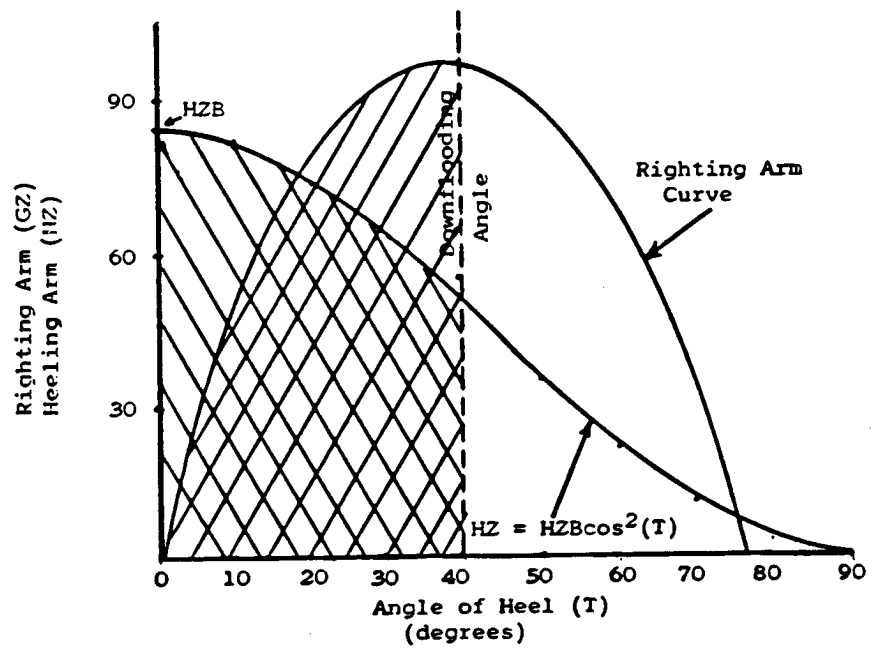
Truncation of Righting Arm Curve if Maximum Righting Arm Occurs at an Angle of Heel Less Than 35 Degrees



GRAPH 171.055(b)

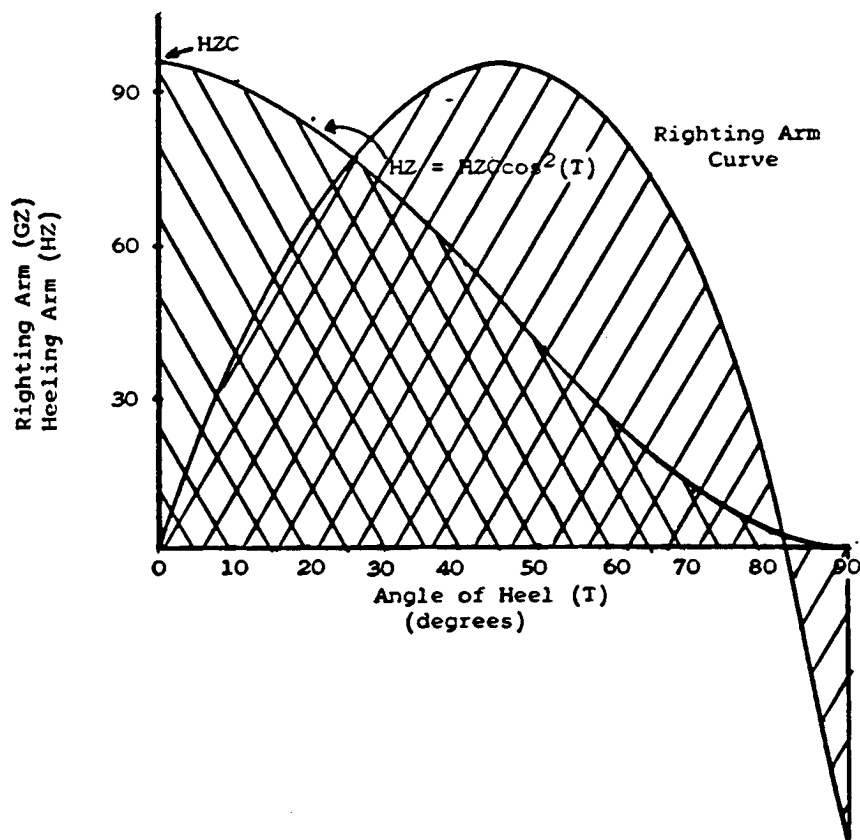
First Intercept Occurs at the Angle at Which Deck
Edge Immersion First Occurs

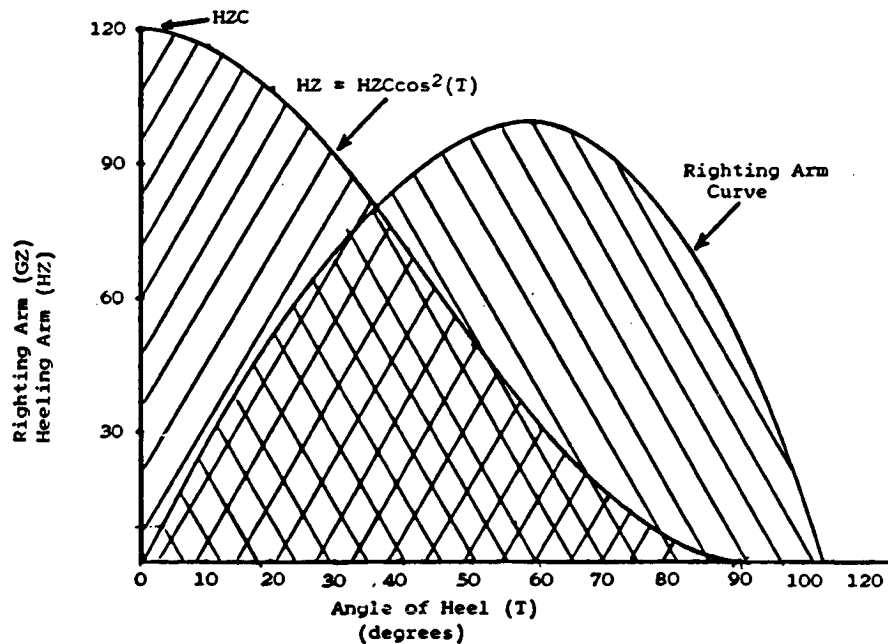


GRAPH 171.055(c)Shaded Areas are Balanced to the Downflooding Angle

GRAPH 171.055(d)

Righting Arm Curve is not Positive to 90 Degrees and Negative Area is Included



GRAPH 171.055(e)Righting Arm Curve is Positive Beyond 90 Degrees

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 83-005, 51, FR 924, Jan. 9, 1986]

§ 171.057 Intact stability requirements for a sailing catamaran.

(a) A sailing vessel that operates on protected waters must be designed to satisfy the following equation:

$$\frac{0.1(W)B}{(As)(Hc)} \geq X$$

Where—

B=the distance between hull centerlines in meters (feet).

As=the maximum sail area in square meters (square feet).

Hc=the height of the center of effort of the sail area above the deck, in meters (feet).

W=the total displacement of the vessel, in kilograms (pounds).

X=4.88 kilograms/square meter (1.0 pounds/square foot).

(b) A sailing vessel that operates on partially protected or exposed waters must be designed to satisfy the following equation:

$$\frac{0.1(W)B}{(As)(Hc)} \geq X$$

Where—

B=the distance between hull centerlines in meters (feet).

§ 171.060

As=the maximum sail area in square meters (square feet).

Hc=the height of the center of effort of the sail area above the deck, in meters (feet).

W=the total displacement of the vessel, in kilograms (pounds).

X=7.32 kilograms/square meter (1.5 pounds/square foot).

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 83-005, 51 FR 924, Jan. 9, 1986; CGD 85-080, 61 FR 944, Jan. 10, 1996]

§ 171.060 Watertight subdivision: General.

(a) Each of the following vessels must be shown by design calculations to comply with the requirements in §§171.065 through 171.068 for Type I subdivision or §171.075 for Type III subdivision:

(1) Each vessel 100 gross tons or more on an international voyage; and

(2) Each vessel 150 gross tons or more in ocean service.

(b) Each vessel not described in paragraph (a) of this section must be shown by design calculations to comply with the requirements in §§171.070 to 171.073 for Type II subdivision.

(c) Except as allowed in §171.070(c), each vessel must have a collision bulkhead.

(d) Each double-ended ferry that is required by paragraph (c) of this section to have a collision bulkhead must also have a second collision bulkhead. One collision bulkhead must be located in each end of the vessel.

§ 171.065 Subdivision requirements—Type I.

(a) Except as provided in paragraphs (c) and (f) of this section, the separation between main transverse watertight bulkheads on a vessel, other than one described in paragraph (b) of this section, must not exceed—

(floodable length) X (factor of subdivision)

where—

the factor of subdivision is listed under FS in Table 171.065(a).

(b) The factor of subdivision used to determine compliance with paragraph (a) of this section must be the smaller of 0.5 or the value determined from Table 171.065(a) if—

(1) The vessel is 430 feet (131 meters) or more in LBP; and

46 CFR Ch. I (10-1-98 Edition)

(2) The greater of the values of Y as determined by the following equations equals or exceeds the value of X in Table 171.065(b):

$$Y = \frac{(M + 2P)}{V}$$

or

$$Y = \frac{(M + 2P)}{V + P1 - P}$$

where—

M, V, and P have the same value as listed in Table 171.065(a); and

P1=the smaller of the following:

(i) 0.6LN (0.056LN) where—

N=the total number of passengers; and

L=LBP in feet (meters).

(ii) The greater of the following:

(A) 0.4LN (0.037LN).

(B) The sum of P and the total volume of passenger spaces above the margin line.

(c) The distance A in Figure 171.065 between main transverse watertight bulkheads may exceed the maximum allowed by paragraphs (a) or (b) of this section if each of the distances B and C between adjacent main transverse watertight bulkheads in Figure 171.065 does not exceed the smaller of the following:

(1) The floodable length.

(2) Twice the separation allowed by paragraphs (a) or (b) of this section.

(d) In each vessel 330 feet (100 meters) or more in LBP, one of the main transverse watertight bulkheads aft of the collision bulkhead must be located at a distance from the forward perpendicular that is not greater than the maximum separation allowed by paragraph (a) or (b) of this section.

(e) The minimum separation between two adjacent main transverse watertight bulkheads must be at least 10 feet (3.05 meters) plus 3 percent of the LBP of the vessel, or 35 feet (10.7 meters), whichever is less.

(f) The maximum separation of bulkheads allowed by paragraphs (a) or (b) of this section may be increased by the amount allowed in paragraph (g) of this section if—

(1) The space between two adjacent main transverse watertight bulkheads contains internal watertight volume; and

(2) After the assumed side damage specified in paragraph (h) of this section is applied, the internal watertight volume will not be flooded.

(g) For the purpose of paragraph (f) of this section, the allowable increase in separation is as follows:

$$\text{Increase in separation} = \frac{\text{"total volume of allowed local subdivision"}}{\text{"transverse sectional area at center of compartment"}}$$

where—

"total volume of allowed local subdivision" is determined by calculating the unflooded volume on each side of the centerline and multiplying the smaller volume by two.

(h) The assumed extents of side damage are as follows:

(1) *The longitudinal extent of damage* must be assumed to extend over a length equal to the minimum spacing of bulkheads specified in paragraph (e) of this section.

(2) *The transverse extent of damage* must be assumed to penetrate a distance from the shell plating equal to one-fifth the maximum beam of the vessel and at right angles to the centerline at the level of the deepest subdivision load line.

(3) *The vertical extent of damage* must be assumed to extend vertically from the baseline to the margin line.

(i) The maximum separation between the following bulkheads must not exceed the maximum separation between main transverse watertight bulkheads:

(1) The collision bulkhead and the first main transverse watertight bulkhead aft of the collision bulkhead; and

(2) The last main transverse watertight bulkhead and the aftermost point on the bulkhead deck.

(j) The minimum separation between the following bulkheads must not be less than the minimum separation between main transverse watertight bulkheads:

(1) The collision bulkhead and the first main transverse watertight bulkhead aft of the collision bulkhead; and

(2) The last main transverse watertight bulkhead and the aftermost point on the bulkhead deck.

Figure 171.065

Combined Separation of Bulkheads

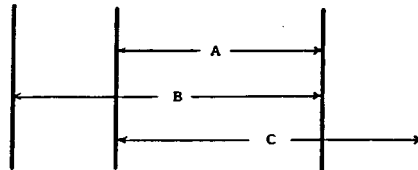


TABLE 171.065(A) (ENGLISH UNITS)

Vessel length (LBP)	Criterion numeral (CN)	FS
Vessel length greater than 392 feet.	CN less than or equal to 23.	A
	CN greater than 23 and less than 123.	F1
	CN greater than or equal to 123.	B
Vessel length greater than or equal to 200 feet and less than or equal to 392 feet.	CN less than or equal to S.	1
	CN greater than S and less than 123.	F2
	CN greater than or equal to 123.	B
Vessel length less than 200 feet.	.....	1

Where—

FS=the factor of subdivision.

CN=60((M+2P)/V)+30000/(N/L²)

A=(190/(L-160))+0.18

B=(94/(L-85))+0.18

F1=A-((A-B)(CN-23)/100)

S=(10904-25L)/48

F2=1-((1-B)(CN-S)/(123-S))

L=the length of the vessel (LBP) in feet.

M=the sum of the volume of the machinery space and the volumes of any fuel tanks which are located above the inner bottom forward or aft of the machinery space in cubic feet.

P=the volume of passenger spaces below the margin line.

V=the volume of the vessel below the margin line.

N=the number of passengers that the vessel is to be certificated to carry.

TABLE 171.065(A) (METRIC UNITS)

Vessel length (LBP)	Criterion numeral (CN)	FS
Vessel length greater than 120 meters.	CN less than or equal to 23	A
	CN greater than 23 and less than 123.	F1
	CN greater than or equal to 123.	B
Vessel length greater than or equal to 61 meters and less than or equal to 120 meters.	CN less than or equal to S.	1
	CN greater than S and less than 123.	F2
	CN greater than or equal to 123.	B
Vessel length less than 61 meters.	.....	1

Where—
 FS=the factor of subdivision.
 $CN=60((M+2P)/V)+2787(N/L^2)$
 $A=(58/(L-49))+0.18$
 $B=(29/(L-26))+0.18$
 $F1=A - ((A - B)(CN - 23)/100)$
 $S=(3323.5 - 25L)/14.6$
 $F2=1 - ((1 - B)(CN - S)/(123 - S))$
 L=the length of the vessel (LBP) in meters.
 M=the sum of the volume of the machinery space and the volumes of any fuel tanks which are located above the inner bottom forward or aft of the machinery space in cubic meters.
 P=the volume of passenger spaces below the margin line.
 V=the volume of the vessel below the margin line.
 N=the number of passengers that the vessel is to be certificated to carry.

TABLE 171.065(B)—TABLE OF X

Vessel LBP in feet (meters)	X ¹
430 (131)	1.336
440 (134)	1.285
450 (137)	1.230
460 (140)	1.174
470 (143)	1.117
480 (146)	1.060
490 (149)	1.002
500 (152)	0.944
510 (155)	0.885
520 (158)	0.826
530 (162)	0.766
540 (165)	0.706
550 (168)	0.645
554 (169) and up	0.625

¹ Interpolate for intermediate values.

§ 171.066 Calculation of permeability for Type I subdivision.

(a) Except as prescribed in paragraph (b) of this section, the following permeabilities must be used when doing the calculations required to demonstrate compliance with § 171.065(a), (b), and (c):

(1) When doing calculations required to demonstrate compliance with § 171.065(a) and (b), the uniform average permeability given by the formulas in Table 171.066 must be used.

(2) When doing calculations required to demonstrate that compartments on opposite sides of a main transverse watertight bulkhead that bounds the machinery space comply with § 171.065(c), the mean of the uniform average permeabilities determined from Table 171.066 for the two compartments must be used.

(b) If an average permeability can be calculated that is less than that given by the formulas in Table 171.066, the lesser value may be substituted if approved by the Commanding Officer, Marine Safety Center. When determining this lesser value, the following permeabilities must be used:

(1) 95% for passenger, crew, and all other spaces that, in the full load condition, normally contain no cargo, stores, provisions, or mail.

(2) 60% for cargo, stores, provisions, or mail spaces.

(3) 85% for spaces containing machinery.

(4) Values approved by the Commanding Officer, Marine Safety Center for double bottoms, oil fuel, and other tanks.

(c) In the case of unusual arrangements, the Commanding Officer, Marine Safety Center may require a detailed calculation of average permeability for the portions of the vessel forward or aft of the machinery spaces. When doing these calculations, the permeabilities specified in paragraph (b) of this section must be used.

(d) When calculating permeability, the total volume of the 'tween deck spaces between two adjacent main transverse watertight bulkheads that contains any passenger or crew space must be regarded as passenger space volume, except that the volume of any space that is completely enclosed in steel bulkheads and is not a crew or passenger space may be excluded.

TABLE 171.066—TABLE OF UNIFORM AVERAGE PERMEABILITIES

Location	Uniform average permeability
Machinery space	10 (a–c)
	85+ v
Volume forward of machinery space	35(a)
	63+ v

TABLE 171.066—TABLE OF UNIFORM AVERAGE PERMEABILITIES—Continued

Location	Uniform average permeability
	v
Volume aft of machinery space	$\frac{35(a)}{63+v}$

For each location specified in this table—
a=volume below the margin line of all spaces that, in the full load condition, normally contain no cargo, baggage, stores, provisions, or mail.
c=volume below the margin line of the cargo, stores, provisions, or mail spaces within the limits of the machinery space.
v=total volume below the margin line.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

§ 171.067 Treatment of stepped and recessed bulkheads in Type I subdivision.

(a) For the purpose of this section—

(1) The main transverse watertight bulkhead immediately forward of a stepped bulkhead is referred to as bulkhead 1; and

(2) The main transverse watertight bulkhead immediately aft of the stepped bulkhead is referred to as bulkhead 3.

(b) If a main transverse watertight bulkhead is stepped, it and bulkheads 1 and 3 must meet one of the following conditions:

(1) The separation between bulkheads 1 and 3 must not exceed the following:

(i) If the factor of subdivision (FS) determined from § 171.065 (a) or (b) is greater than 0.9, the distance between bulkheads 1 and 3 must not exceed the maximum separation calculated to demonstrate compliance with § 171.065.

(ii) If the factor of subdivision is 0.9 or less, the distance between bulkheads

1 and 3 must not exceed 90% of the floodable length or twice the maximum bulkhead separation calculated to demonstrate compliance with § 171.065, whichever is smaller.

(2) Additional watertight bulkheads must be located as shown in Figure 171.067(a) so that distances A, B, C, and D, illustrated in Figure 171.067(a), satisfy the following:

(i) Distances A and B must not exceed the maximum spacing allowed by § 171.065.

(ii) Distances C and D must not be less than the minimum separation prescribed by § 171.065(e).

(3) The distance A, illustrated in Figure 171.067(b), must not exceed the maximum length determined in § 171.065 corresponding to a margin line taken 3 inches (7.6 cm) below the step.

(c) A main transverse bulkhead may not be recessed unless all parts of the recess are inboard from the shell of the vessel a distance A as illustrated in Figure 171.067(c).

(d) Any part of a recess that lies outside the limits defined in paragraph (c) of this section must be treated as a step in accordance with paragraph (b) of this section.

(e) The distance between a main transverse watertight bulkhead and the transverse plane passing through the nearest portion of a recessed bulkhead must be greater than the minimum separation specified by § 171.065(e).

(f) If a main transverse bulkhead is stepped or recessed, equivalent plane bulkheads must be used in the calculations required to demonstrate compliance with § 171.065.

Figure 171.067(a)
Additional Subdivision

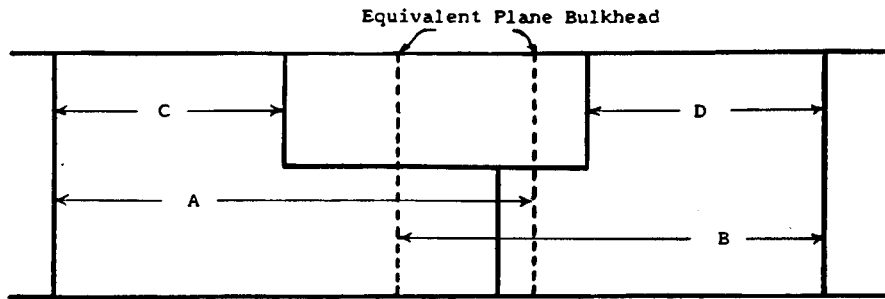


Figure 171.067(b)
Margin Line Below Step

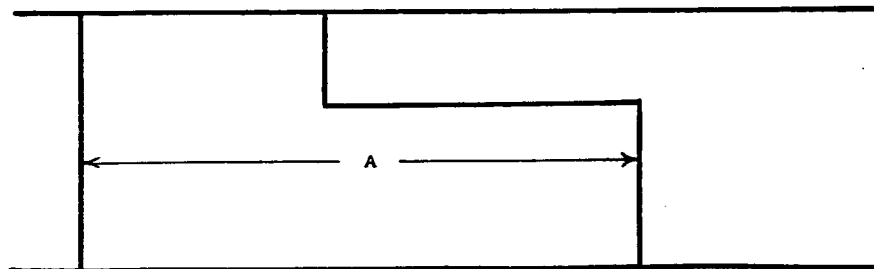
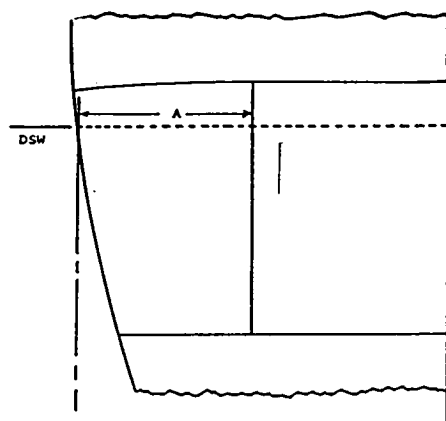
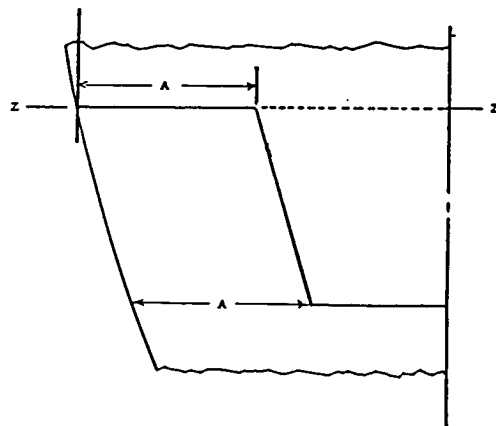


Figure 171.067(c)Limits of a RecessSection Through Recess
At ZZ

A = One-fifth the maximum beam measured
on the waterline corresponding to
the deepest subdivision waterline.

DSW = Deepest subdivision waterline

Plan View of Recess at
the waterline corresponding
to the deepest subdivision
waterline

**§171.068 Special considerations for
Type I subdivision for vessels on
short international voyages.**

(a) The calculations done to demonstrate compliance with §171.065 for a vessel that makes short international voyages and is permitted under §75.10-10 of this chapter to carry a number of

persons on board in excess of the life-boat capacity must—

- (1) Assume the uniform average permeabilities given in Table 171.068 in lieu of those in Table 171.066; and
- (2) Use a factor of subdivision (FS) that is the smaller of the following:
 - (i) The value from Table 171.065(a).
 - (ii) 0.50.

§ 171.070

46 CFR Ch. I (10–1–98 Edition)

(b) For a vessel less than 300 feet (91 meters) in length, the Commanding Officer, Marine Safety Center may approve the separation of main transverse watertight bulkheads greater than that permitted by paragraph (a) of this section if—

(1) The shorter separation is impracticable; and

(2) The separation is the smallest that is practicable.

(c) In the case of ships less than 180 feet (55 meters) in length, the Commanding Officer, Marine Safety Center may approve a further relaxation in the bulkhead spacing. However, in no case may the separation be large enough to prevent the vessel from complying with the flooding requirements for Type II subdivision in § 171.070.

TABLE 171.068—TABLE OF UNIFORM AVERAGE PERMEABILITIES

Location	Uniform average permeability
Machinery Space	$85 + \frac{10(a-c)}{v}$
Volume Forward of Machinery Space	$95 - \frac{35(b)}{v}$
Volume Aft of Machinery Space	$95 - \frac{35(b)}{v}$

For each location specified in this table—
a=volume below the margin line of all spaces that, in the full load condition, normally contain no cargo, baggage, stores, provisions, or mail.

b=volume below the margin line and above the tops of floors, inner bottoms, or peak tanks of coal or oil fuel bunkers, chain lockers, fresh water tanks, and of all spaces that, in the full load condition, normally contain stores, baggage, mail, cargo, or provisions. If cargo holds are not occupied by cargo, no part of the cargo space is to be included in this volume.

c=volume below the margin line of the cargo, stores, provisions, or mail spaces within the limits of the machinery space.
v=total volume below the margin line.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

§ 171.070 Subdivision requirements—Type II.

(a) Each vessel, except a ferry vessel, must be designed so that, while in each condition of loading and operation, it complies with the standard of flooding specified in Table 171.070(a).

(b) Except as provided in paragraph (c), each ferry vessel must be designed so that, while in each condition of loading and operation, it meets the

standard of flooding specified in Table 171.070(b).

(c) A ferry vessel described in paragraph (d) of this section need not meet the standard of flooding specified in Table 171.070(b), except that a ferry vessel in Great Lakes service must at least have a collision bulkhead.

(d) Paragraph (c) of this section applies to a ferry vessel that—

(1) Is 150 feet (46 meters) or less in length; and

(2) Has sufficient air tankage, or other internal buoyancy to float the vessel with no part of the margin line submerged when the vessel is completely flooded. If foam is used to comply with this paragraph, it must be installed in accordance with the requirements in § 170.245 of this subchapter.

(e) Except as specified in paragraph (f) of this section, each main transverse watertight bulkhead must be spaced as follows:

(1) If the LBP of the vessel is 143 feet (43.5 meters) or more, each main transverse watertight bulkhead must be at least 10 feet (3 meters) plus 3 percent of the vessel's LBP from—

(i) Every other main transverse watertight bulkhead;

(ii) The collision bulkhead; and

(iii) The aftermost point on the bulkhead deck.

(2) If the LBP of the vessel is less than 143 feet (43.5 meters) and the vessel does not make international voyages, each main transverse watertight bulkhead must be no less than 10 percent of the vessel's LBP or 6 feet (1.8 meters), whichever is greater, from—

(i) Every other main transverse watertight bulkhead;

(ii) The collision bulkhead; and

(iii) The aftermost point on the bulkhead deck.

(f) If a vessel is required by § 171.060 to have a collision bulkhead in each end of the vessel, then each main transverse watertight bulkhead must be no less than the distance specified in paragraph (e) of this section from—

(1) Every other main transverse watertight bulkhead; and

(2) Each collision bulkhead.

Coast Guard, DOT

§ 171.080

TABLE 171.070(A)—STANDARD OF FLOODING

Passengers carried	Part of vessel	Standard of flooding (compartments)
400 or less	All	1
401 to 600	All of the vessel forward of the first MTWB aft of the collision bulkhead..	2
	All remaining portions of the vessel.	1
601 to 800	All of the vessel forward of the first MTWB that is aft of a point 40% of the vessel's LBP aft of the forward perpendicular.	2
	All remaining portions of the vessel.	1
801 to 1000	All of the vessel forward of the first MTWB that is aft of a point 60% of the vessel's LBP aft of the forward perpendicular..	2
	All remaining portions of the vessel.	1
More than 1000	All	2

Where for this table—
 "MTWB" means main transverse watertight bulkhead; and
 "Standard of Flooding" is explained in § 171.017 of this subchapter.

TABLE 171.070(B)—STANDARD OF FLOODING FOR FERRY VESSELS

Vessel length	Part of vessel	Standard of flooding (compartments)
150 feet (46 meters) or less.	All	1
Greater than 150 feet (46 meters) and less than or equal to 200 feet (61 meters).	All of the vessel forward of the first MTWB aft of the collision bulkhead.	2
	All of the vessel aft of the first MTWB forward of the aft peak bulkhead.	2
	All remaining portions of the vessel.	1
Greater than 200 feet (61 meters).	All	2

Where for this table—
 "MTWB" means main transverse watertight bulkhead; and
 "Standard of Flooding" is explained in § 171.017 of this subchapter.

§ 171.072 Calculation of permeability for Type II subdivision.

When doing calculations to show compliance with § 171.070, the following

uniform average permeabilities must be assumed:

- (a) 85 percent in the machinery space.
- (b) 60 percent in the following spaces:
 - (1) Tanks that are normally filled when the vessel is in the full load condition.
 - (2) Chain lockers.
 - (3) Cargo spaces.
 - (4) Stores spaces.
 - (5) Mail or baggage spaces.
- (c) 95 percent in all other spaces.

§ 171.073 Treatment of stepped and recessed bulkheads in Type II subdivision.

(a) A main transverse watertight bulkhead may not be stepped unless additional watertight bulkheads are located as shown in Figure 171.067(a) so that the distances A, B, C, and D illustrated in Figure 171.067(a) comply with the following:

- (1) A and B must not exceed the maximum bulkhead spacing that permits compliance with § 171.070; and
- (2) C and D must not be less than the minimum spacing specified in § 171.070(e).

(b) A main transverse watertight bulkhead may not be recessed unless all parts of the recess are inboard from the shell of the vessel as illustrated in Figure 171.067(c).

(c) If a main transverse watertight bulkhead is recessed or stepped, an equivalent plane bulkhead must be used in the calculations required by § 171.070.

§ 171.075 Subdivision requirements—Type III.

(a) Each vessel must be shown by design calculations to comply with the requirements of Regulations 1, 2, 3, 4, 6, and 7 of the Annex to Resolution A.265 (VIII) of the International Maritime Organization (IMO).

(b) International Maritime Organization Resolution A.265 (VIII) is incorporated by reference into this part.

(c) As used in IMO Resolution A.265 (VIII), "Administration" means the Commandant, U.S. Coast Guard.

§ 171.080 Damage stability standards for vessels with Type I or Type II subdivision.

(a) *Calculations.* Each vessel with Type I or Type II subdivision must be

shown by design calculations to meet the survival conditions in paragraph (e), (f), or (g) of this section in each condition of loading and operation assuming the extent and character of damage specified in paragraph (b) of this section.

(b) *Extent and character of damage.* For the purpose of paragraph (a) of this section, design calculations must assume that the damage—

(1) Has the character specified in Table 171.080(a); and

(2) Consists of a penetration having the dimensions specified in Table 171.080(a) except that, if the most disabling penetration would be less than the penetration described in the table, the smaller penetration must be assumed.

(c) *Permeability.* When doing the calculations required in paragraph (a) of this section, the permeability of each space must be calculated in a manner approved by the Commanding Officer, Marine Safety Center or be taken from Table 171.080(c).

(d) *Definitions.* For the purposes of paragraphs (e) and (f) of this section, the following definitions apply:

(1) *New vessel* means a vessel—

(i) For which a building contract is placed on or after April 15, 1996;

(ii) In the absence of a building contract, the keel of which is laid, or which is at a similar stage of construction, on or after April 15, 1996;

(iii) The delivery of which occurs on or after January 1, 1997;

(iv) Application for the reflagging of which is made on or after January 1, 1997; or

(v) That has undergone—

(A) A major conversion for which the conversion contract is placed on or after April 15, 1996;

(B) In the absence of a contract, a major conversion begun on or after April 15, 1996; or

(C) A major conversion completed on or after January 1, 1997.

(2) *Existing vessel* means other than a new vessel.

(3) *Watertight* means capable of preventing the passage of water through the structure in any direction under a head of water for which the surrounding structure is designed.

(4) *Weathertight* means capable of preventing the penetration of water, even boarding seas, into the vessel in any sea condition.

(e) *Damage survival for all existing vessels except those vessels authorized to carry more than 12 passengers on an international voyage requiring a SOLAS Passenger Ship Safety Certificate.* An existing vessel is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(1) On a vessel required to survive assumed damage with a longitudinal extent of 10 feet (3 meters) plus 0.03L, the final angle of equilibrium must not exceed 7 degrees after equalization, except that the final angle may be as large as 15 degrees if—

(i) The vessel is not equipped with equalization or is equipped with fully automatic equalization; and

(ii) The Commanding Officer, Marine Safety Center approves the vessel's range of stability in the damaged condition.

(2) On a vessel required to survive assumed damage with a longitudinal extent of 20 feet (6.1 meters) plus 0.04L, the angle of equilibrium must not exceed 15 degrees after equalization.

(3) The margin line may not be submerged at any point.

(4) The vessel's metacentric height (GM) must be at least 2 inches (5 cm) when the vessel is in the upright position.

(f) *Damage survival for all new vessels except those vessels authorized to carry more than 12 passengers on an international voyage requiring a SOLAS Passenger Ship Safety Certificate.* A new vessel is presumed to survive assumed damage if it is shown by calculations to meet the conditions set forth in paragraphs (f) (1) through (7) of this section in the final stage of flooding and to meet the conditions set forth in paragraphs (f) (8) and (9) of this section in each intermediate stage of flooding. For the purposes of establishing boundaries to determine compliance with the requirements in paragraphs (f) (1) through (9), openings that are fitted with weathertight closures and that are not submerged during any stage of flooding will not be considered downflooding points.

(1) Each vessel must have positive righting arms for a minimum range beyond the angle of equilibrium as follows:

Vessel service	Required range (degrees)
Exposed waters, oceans, or Great Lakes winter ..	15
Partially protected waters or Great Lakes summer	10
Protected waters	5

(2) No vessel may have any opening through which downflooding can occur within the minimum range specified by paragraph (f)(1) of this section.

(3) Each vessel must have an area under each righting-arm curve of at least 0.015 meter-radians, measured from the angle of equilibrium to the smaller of the following angles:

(i) The angle at which downflooding occurs.

(ii) The angle of vanishing stability.

(4) Except as provided by paragraph (f)(5) of this section, each vessel must have within the positive range the greater of a righting arm (GZ) equal to or greater than 0.10 meter or a GZ as calculated using the formula:

$$GZ(m) = C \left(\frac{\text{Heeling Moment}}{\Delta} + 0.04 \right)$$

where—

C=1.00 for vessels on exposed waters, oceans, or Great Lakes winter;

C=0.75 for vessels on partially protected waters or Great Lakes summer;

C=0.50 for vessels on protected waters;

Δ=intact displacement; and

Heeling moment=greatest of the heeling moments as calculated in paragraphs (f)(4)(i) through (iv) of this section.

(i) The passenger heeling moment is calculated using the formula:

Passenger Heeling Moment=0.5 (n w b)

where—

n=number of passengers;

w=passenger weight = 75 kilograms; and

b=distance from the centerline of the vessel to the geometric center on one side of the centerline of the passenger deck used to leave the vessel in case of flooding.

(ii) The heeling moment due to asymmetric escape routes for passengers, if the vessel has asymmetric escape routes for passengers, is calculated assuming that—

(A) Each passenger weighs 75 kilograms;

(B) Each passenger occupies 0.25 square meter of deck area; and

(C) All passengers are distributed, on available deck areas unoccupied by permanently affixed objects, toward one side of the vessel on the decks where passengers would move to escape from the vessel in case of flooding, so that they produce the most adverse heeling moment.

(iii) The heeling moment due to the launching of survival craft is calculated assuming that—

(A) All survival craft, including davit-launched liferafts and rescue boats, fitted on the side to which the vessel heels after sustained damage, are swung out if necessary, fully loaded and ready for lowering;

(B) Persons not in the survival craft swung out and ready for lowering are distributed about the centerline of the vessel so that they do not provide additional heeling or righting moments; and

(C) Survival craft on the side of the vessel opposite that to which the vessel heels remain stowed.

(iv) The heeling moment due to wind pressure is calculated assuming that—

(A) The wind exerts a pressure of 120 Newtons per square meter;

(B) The wind acts on an area equal to the projected lateral area of the vessel above the waterline corresponding to the intact condition; and

(C) The lever arm of the wind is the vertical distance from a point at one-half the mean draft, or the center of area below the waterline, to the center of the lateral area.

(5) Each vessel whose arrangements do not generally allow port or starboard egress may be exempted, by the Commanding Officer, Marine Safety Center, from the transverse passenger heeling moment required by paragraph (f)(4)(i) of this section. Each vessel exempted must have sufficient longitudinal stability to prevent immersion of the deck edge during forward or aft egress.

(6) Each vessel must have an angle of equilibrium that does not exceed—

(i) 7 degrees for flooding of one compartment;

(ii) 12 degrees for flooding of two compartments; or

(iii) A maximum of 15 degrees for flooding of one or two compartments where—

(A) The vessel has positive righting arms for at least 20 degrees beyond the angle of equilibrium; and

(B) The vessel has an area under each righting-arm curve, when the equilibrium angle is between 7 degrees and 15 degrees, in accordance with the formula:

$$A \geq 0.0025(\theta - 1)$$

where—

A=Area required in m-rad under each righting-arm curve measured from the angle of equilibrium to the smaller of either the angle at which downflooding occurs or the angle of vanishing stability.

θ =actual angle of equilibrium in degrees

(7) The margin line of the vessel must not be submerged when the vessel is in equilibrium.

(8) Each vessel must have a maximum angle of equilibrium that does not exceed 15 degrees during intermediate stages of flooding.

(9) Each vessel must have a range of stability and a maximum righting arm during each intermediate stage of flooding as follows:

Vessel service	Required range (degrees)	Required maximum righting arm
Exposed waters, oceans, or Great Lakes winter	7	0.05 m
Partially-protected waters or Great Lakes summer	5	0.035 m
Protected waters	5	0.035 m

Only one breach in the hull and only one free surface need be assumed when

meeting the requirements of this paragraph.

(g) *Damage survival for vessels authorized to carry more than 12 passengers on an international voyage requiring a SOLAS Passenger Ship Safety Certificate.* A vessel is presumed to survive assumed damage if it is shown by calculations to comply with the damage stability required for that vessel by the International Convention for the Safety of Life at Sea, 1974, as amended, chapter II-1, part B, regulation 8.

(h) *Equalization.* (1) Equalization systems on vessels of 150 gross tons or more in ocean service must meet the following:

(i) Equalization must be automatic except that the Commanding Officer, Marine Safety Center may approve other means of equalization if—

(A) It is impracticable to make equalization automatic; and

(B) Controls to cross-flooding equipment are located above the bulkhead deck.

(ii) Equalization must be fully accomplished within 15 minutes after damage occurs.

(2) Equalization on vessels under 150 gross tons in ocean service and on all vessels in other than ocean service must meet the following:

(i) Equalization must not depend on the operation of valves.

(ii) Equalization must be fully accomplished within 15 minutes after damage occurs.

(3) The estimated maximum angle of heel before equalization must be approved by the Commanding Officer, Marine Safety Center.

TABLE 171.080(A)—EXTENT AND CHARACTER OF DAMAGE

Vessel designator ¹	Longitudinal penetration ²	Transverse penetration ^{3,4}	Vertical penetration	Character of Damage
Z	10 feet (3 meters) plus .03L or 35 feet (10.7 meters) whichever is less. ⁵	B/5	from the baseline upward without limit.	Assumes no damage to any main transverse watertight bulkhead.
Y	10 feet (3 meters) plus .03L or 35 feet (10.7 meters) whichever is less.	B/5	From the baseline upward without limit.	Assumes damage to no more than one main transverse watertight bulkhead.
X	10 feet (3 meters) plus .03L or 35 feet (10.7 meters) whichever is less.	B/5	from the baseline upward without limit.	Assumes damage to no more than one main transverse watertight bulkhead.
	20 feet (6.1 meters) plus 0.04L	B/5	From the top of the double bottom upward without limit.	Assumes damage to no more than one main transverse watertight bulkhead.

TABLE 171.080(A)—EXTENT AND CHARACTER OF DAMAGE—Continued

Vessel designator ¹	Longitudinal penetration ²	Transverse penetration ^{3,4}	Vertical penetration	Character of Damage
W	20 feet (6.1 meters) plus 0.04L	B/5	From the baseline upward without limit.	Assumes damage to at least two main transverse watertight bulkheads.

(¹) W, X, Y, and Z are determined from Table 171.080(b).

(²) L=LBP of the vessel in feet (meters).

(³) B=the beam of the vessel in feet (meters) measured at or below the deepest subdivision load line as defined in 171.010(a) except that, when doing calculations for a vessel that operates only on inland waters or a ferry vessel, B may be taken as the mean of the maximum beam on the bulkhead deck and the maximum beam at the deepest subdivision load line.

(⁴) The transverse penetration is applied inboard from the side of the vessel, at right angles to the centerline, at the level of the deepest subdivision load line.

(⁵) .1L or 6 feet (1.8 meters) whichever is greater for vessels described in § 171.070(e)(2).

TABLE 171.080(B)

Vessel category	Vessel designator
Vessels with type I subdivision and a factor of subdivision as determined from § 171.065 (a) or (b) of 0.33 or less.	W.
Vessels with type I subdivision and a factor of subdivision as determined from § 171.065 (a) or (b) greater than 0.33 and less than or equal to 0.50.	X.
Vessels with Type II subdivision that are required to meet a two compartment standard of flooding.	Y.
All other vessels	Z.

TABLE 171.080(C)—PERMEABILITY

Spaces and tanks	Permeability (percent)
Cargo, coal, stores	60.
Accommodations	95.
Machinery	85.
Tanks	0 or 95. ¹

¹ Whichever value results in the more disabling condition.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988; CGD 89-037, 57 FR 41826, Sept. 11, 1992; CGD 94-010, 60 FR 53713, Oct. 17, 1995; CGD 97-057, 62 FR 51049, Sept. 30, 1997]

§ 171.082 Damage stability standards for vessels with Type III subdivision.

(a) Each vessel must be shown by design calculations to comply with the requirements of Regulations 1 and 5 of the Annex to Resolution A.265 (VIII) of the International Maritime Organization (IMO).

(b) International Maritime Organization Resolution A.265 (VIII) is incorporated by reference into this part.

(c) As used in IMO Resolution A.265 (VIII), "Administration" means the Commandant, U.S. Coast Guard.

(d) Section 56.50-57 of this chapter contains additional requirements on bilge pumping and piping systems.

Subpart D—Additional Subdivision Requirements

§ 171.085 Collision bulkhead.

(a) Paragraphs (b) through (g) of this section apply to each vessel of 100 gross tons or more and paragraphs (h) through (j) of this section apply to each vessel that is less than 100 gross tons.

(b) The portion of the collision bulkhead that is below the bulkhead deck must be watertight.

(c) Each portion of the collision bulkhead must be at least—

(1) 5 percent of the LBP from the forward perpendicular in a motor vessel; and

(2) 5 feet (1.52 meters) from the forward perpendicular in a steam vessel.

(d) The collision bulkhead must be no more than 10 feet (3 meters) plus 5 percent of the LBP from the forward perpendicular.

(e) The collision bulkhead must extend to the deck above the bulkhead deck if the vessel—

(1) Is in ocean service; and

(2) Has a superstructure that extends from a point forward of the collision bulkhead to a point at least 15 percent of the LBP aft of the collision bulkhead.

(f) The collision bulkhead required by paragraph (e) of this section must have the following characteristics:

(1) The portion of the collision bulkhead above the bulkhead deck must be weathertight.

(2) If the portion of the collision bulkhead above the bulkhead deck is

§ 171.090

not located directly above the collision bulkhead below the bulkhead deck, then the bulkhead deck between must be weathertight.

(g) Each opening in the collision bulkhead must—

(1) Be located above the bulkhead deck; and

(2) Have a watertight closure.

(h) Each collision bulkhead—

(1) Must extend to the deck above the bulkhead deck if in ocean service as defined in § 170.050(f) of this chapter or to the bulkhead deck if in service on other waters;

(2) May not have watertight doors in it; and

(3) May have penetrations and openings that—

(i) Are located as high and as far inboard as practicable; and

(ii) Except as provided in paragraph (i) of this section, have means to make them watertight.

(i) Each vessel that is not required to comply with a one or two compartment standard of flooding may have an opening that cannot be made watertight in the collision bulkhead below the bulkhead deck if—

(1) The lowest edge of the opening is not more than 12 inches (30.5 centimeters) below the bulkhead deck; and

(2) There are at least 36 inches (92 centimeters) of intact collision bulkhead below the lower edge of the opening.

(j) Each portion of the collision bulkhead must be—

(1) At least 5 percent of the LBP from the forward perpendicular; and

(2) No more than 15 percent of the LBP from the forward perpendicular if the space forward of the collision bulkhead is not subject to damage stability requirements and at any location aft of the location described in paragraph (j)(1) of this section if the space forward of the collision bulkhead is subject to damage stability requirements.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 945, Jan. 10, 1996]

§ 171.090 Aft peak bulkhead.

(a) Each of the following vessels must have an aft peak bulkhead:

(1) Each vessel 100 gross tons or more on an international voyage.

46 CFR Ch. I (10-1-98 Edition)

(2) Each other vessel of more than 150 gross tons.

(b) Except as specified in paragraph (c) of this section, each portion of the aft peak bulkhead below the bulkhead deck must be watertight.

(c) A vessel may have an aft peak bulkhead that does not intersect the bulkhead deck if approved by the Commanding Officer, Marine Safety Center.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

§ 171.095 Machinery space bulkhead.

(a) This section applies to each vessel of 100 gross tons or more.

(b) Except as provided in paragraph (c) of this section, a vessel required to have Type I or II subdivision must have enough main transverse watertight bulkheads to separate the machinery space from the remainder of the vessel. All portions of these bulkheads must be watertight below the bulkhead deck.

(c) Compliance with paragraph (b) of this section is not required if the vessel has sufficient air tanks or other internal buoyancy to maintain the vessel afloat while in the full load condition when all compartments and all other tanks are flooded. If foam is used to comply with this paragraph, it must be installed in accordance with the requirements in § 170.245 of this subchapter.

§ 171.100 Shaft tunnels and stern tubes.

(a) Stern tubes in each of the following vessels must be enclosed in watertight spaces:

(1) Each vessel of 100 gross tons or more on an international voyage.

(2) Each other vessel over 150 gross tons in ocean or Great Lakes service.

(3) Each vessel under 100 gross tons that carries more than 12 passengers on an international voyage.

(b) The watertight seal in the bulkhead between the stern tube space and the machinery space must be located in a watertight shaft tunnel. The vessel must be designed so that the margin line will not be submerged when the watertight shaft tunnel is flooded.

(c) If a vessel has two or more shaft tunnels, they must be connected by a watertight passageway.

(d) If a vessel has two or less shaft tunnels, only one door is permitted between them and the machinery space. If a vessel has more than two shaft tunnels, only two doors are permitted between them and the machinery space.

§ 171.105 Double bottoms.

(a) This section applies to each vessel that carries more than 12 passengers on an international voyage and all other vessels that are—

- (1) 100 gross tons or more; and
- (2) In ocean or Great Lakes service.

(b) Each vessel over 165 feet (50 meters) and under 200 feet (61 meters) in LBP must have a double bottom that extends from the forward end of the machinery space to the fore peak bulkhead.

(c) Each vessel over 200 feet (61 meters) and under 249 feet (76 meters) in LBP must have a double bottom that extends from the fore peak bulkhead to the forward end of the machinery space

and a double bottom that extends from the aft peak bulkhead to the aft end of the machinery space.

(d) Each vessel 249 feet (76 meters) in LBP and upward must have a double bottom that extends from the fore to the aft peak bulkhead.

(e) Each double bottom required by this section must be at least the depth at the centerline given by the following equation:≤

$$D=18.0+0.05(L) \text{ inches}$$

$$D=45.7+0.417(L) \text{ centimeters}$$

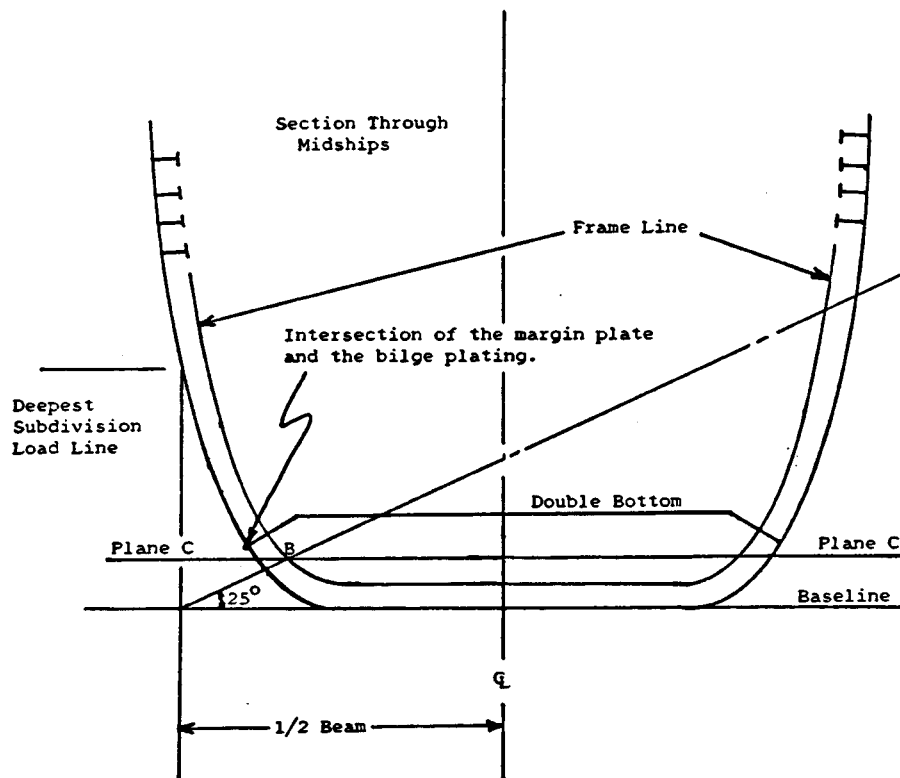
where—

D=the depth at the centerline in inches (centimeters).

L=LBP in feet (meters).

(f) The line formed by the intersection of the margin plate and the bilge plating must be above the horizontal plane C, illustrated in Figure 171.105, at all points. The horizontal plane C is defined by point B, located, as shown in Figure 171.105, in the midships section.

Figure 171.105

Lower Limit of the Intersection of Margin Plate and Bilge Plating

(g) A double bottom is not required in a tank that is integral with the hull of a vessel if—

- (1) The tank is used exclusively for the carriage of liquids; and
- (2) It is approved by the Commanding Officer, Marine Safety Center.

(h) A double bottom is not required in any part of a vessel where the separation of main transverse watertight bulkheads is governed by a factor of subdivision less than or equal to 0.50 if—

- (1) The Commanding Officer, Marine Safety Center approves;

(2) The vessel makes short international voyages; and

(3) The vessel is permitted by § 75.10-10 of this chapter to carry a number of passengers in excess of the lifeboat capacity.

[CGD 79-023, 48 FR 51017, Nov 4, 1983, as amended by CGD 88-070, 53 FR 34532, Sept. 7, 1988]

§ 171.106 Wells in double bottoms.

(a) This section applies to each vessel that has a well installed in a double bottom required by § 171.105.

(b) Except as provided in paragraph (c) of this section—

(1) The depth of a well must be at least 18 inches (45.7 cm) less than the depth of the double bottom at the centerline; and

(2) The well may not extend below the horizontal plane C illustrated in Figure 171.105.

(c) A well may extend to the outer bottom of a double bottom at the after end of a shaft tunnel.

§ 171.108 Manholes in double bottoms.

(a) The number of manholes in the inner bottom of a double bottom required by § 171.105 must be reduced to the minimum required for adequate access.

(b) Each manhole must have a cover that can be—

(1) Made watertight; and

(2) Protected from damage by cargo or coal.

§ 171.109 Watertight floors in double bottoms.

If a vessel is required to have a double bottom, a watertight transverse division must be located in the double bottom under each main transverse watertight bulkhead or as near as practicable to the main transverse watertight bulkhead. If a vessel also has duct keels, the transverse divisions need not extend across them.

Subpart E—Penetrations and Openings in Watertight Bulkheads

§ 171.110 Specific applicability.

(a) Sections 171.111, 171.112, and 171.113 apply to each vessel of 100 gross tons or more.

(b) Section 171.114 applies to each vessel under 100 gross tons.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 945, Jan. 10, 1996; 62 FR 51353, Sept. 30, 1997]

§ 171.111 Penetrations and openings in watertight bulkheads in vessels of 100 gross tons or more.

(a) Except as provided in paragraph (f) of this section, each opening in a watertight bulkhead must have a means to close it watertight.

(b) Except in a machinery space, the means for closing each opening may not be by bolted portable plates.

(c) If a main transverse watertight bulkhead is penetrated, the penetration must be made watertight. Lead or other heat sensitive materials must not be used in a system that penetrates a main transverse watertight bulkhead if fire damage to this system would reduce the watertight integrity of the bulkhead.

(d) A main transverse watertight bulkhead must not be penetrated by valves or cocks unless they are a part of a piping system.

(e) If a pipe, scupper, or electric cable passes through a main transverse watertight bulkhead, the opening through which it passes must be watertight.

(f) A main transverse watertight bulkhead may not have non-watertight penetrations below the bulkhead deck unless—

(1) The margin line is more than 9 inches (23 centimeters) below the bulkhead deck at the intersection of the margin line and the line formed by the intersection of the plane of the main transverse watertight bulkhead and the shell; and

(2) Making all penetrations watertight is impracticable.

(g) Penetrations approved in accordance with paragraph (f) of this section must comply with the following:

(1) The bottom of the penetration must not be located—

(i) More than 24 inches (61 centimeters) below the bulkhead deck; nor

(ii) Less than 9 inches (23 centimeters) above the margin line.

(2) The penetration must not be located outboard from the centerline more than ¼ of the beam of the vessel measured—

(i) On the bulkhead deck; and

(ii) In the vertical plane of the penetration.

(h) No doors, manholes, or other access openings may be located in a watertight bulkhead that separates two cargo spaces or a cargo space and a permanent or reserve bunker.

§ 171.112 Watertight door openings.

(a) The opening for a watertight door must be located as high in the bulkhead and as far inboard as practicable.

§ 171.113

(b) No more than one door, other than a door to a bunker or shaft alley, may be fitted in a main transverse watertight bulkhead within spaces containing the following:

- (1) Main and auxiliary propulsion machinery.
- (2) Propulsion boilers.
- (3) Permanent bunkers.

§ 171.113 Trunks.

(a) For the purpose of this section, “trunk” means a large enclosed passageway through any deck or bulkhead of a vessel.

(b) Each trunk, other than those specified in paragraph (c) of this section, must have a watertight door at each end except that a trunk may have a watertight door at one end if—

(1) The trunk does not pass through more than one main compartment;

(2) The sides of the trunk are not nearer to the shell than is permitted by § 171.067(c) for the sides of a recess in a bulkhead; and

(3) The vessel complies with the subdivision requirements in this part when the volume of the trunk is included with the volume of the compartment into which it opens.

(c) Each trunk that provides access from a crew accommodation space and that passes through a main transverse watertight bulkhead must comply with the following:

- (1) The trunk must be watertight.
- (2) The trunk, if used for passage at sea, must have at least one end above the margin line and access to the other end of the trunk must be through a watertight door.
- (3) The trunk must not pass through the first main transverse watertight bulkhead aft of the collision bulkhead.

§ 171.114 Penetrations and openings in watertight bulkheads in a vessel less than a 100 gross tons.

(a) Penetrations and openings in watertight bulkheads must—

- (1) Be kept as high and as far inboard as practicable; and
 - (2) Have means to make them watertight.
- (b) Watertight bulkheads must not have sluice valves.

46 CFR Ch. I (10–1–98 Edition)

(c) Each main transverse watertight bulkhead must extend to the bulkhead deck.

[CGD 85–080, 62 FR 51353, Sept. 30, 1997]

Subpart F—Openings in the Side of a Vessel Below the Bulkhead or Weather Deck

§ 171.115 Specific applicability.

(a) Sections 171.116, 171.117, and 171.118 apply to each vessel of 100 gross tons or more.

(b) Section 171.119 applies to each vessel under 100 gross tons.

[CGD 79–023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 85–080, 61 FR 945, Jan. 10, 1996; 62 FR 51353, Sept. 30, 1997]

§ 171.116 Port lights.

(a) A vessel may have port lights below the bulkhead deck if—

(1) It is greater than 150 gross tons; and

(2) It is in ocean service.

(b) All port lights in a space must be non-opening if the sill of any port light in that space is below a line that—

(1) Is drawn parallel to the line formed by the intersection of the bulkhead deck and the shell of the vessel; and

(2) Has its lowest point $2\frac{1}{2}$ percent of the beam of the vessel above the deepest subdivision load line.

(c) For the purpose of paragraph (b) of this section, the beam of the vessel is measured at or below the deepest subdivision load line.

(d) Except as provided in paragraph (e) of this section, no port light may be located in a space that is used exclusively for the carriage of cargo, stores, or coal.

(e) A port light may be located in a space used alternately for the carriage of cargo or passengers.

(f) Each port light installed below the bulkhead deck must conform to the following requirements:

(1) The design of each port light must be approved by the Commanding Officer, Marine Safety Center.

(2) Each non-opening port light must be watertight.

(3) Each opening port light must be constructed so that it can be secured watertight.

(4) Each opening port light must be installed with at least one bolt that is secured by a round slotted or recessed nut that requires a special wrench to remove. The nut must be protected by a sleeve or guard to prevent it from being removed with ordinary tools.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

§ 171.117 Dead covers.

(a) Except as provided in paragraph (b) of this section, each port light with the sill located below the margin line must have a hinged, inside dead cover.

(b) The dead cover on a port light located in an accommodation space for passengers other than steerage passengers may be portable if—

(1) The apparatus for stowing the dead cover is adjacent to its respective port light;

(2) The port light is located above the deck that is immediately above the deepest subdivision load line;

(3) The port light is aft of a point one-eighth of the LBP of the vessel from the forward perpendicular; and

(4) The port light is above a line that—

(i) Is parallel to the line formed by the intersection of the bulkhead deck and the side of the vessel; and

(ii) Has its lowest point at a height of 12 feet (3.66 meters) plus 2½ percent of the beam of the vessel above the deepest subdivision load line.

(c) For the purpose of paragraph (b) of this section, the beam of the vessel is measured at or below the deepest subdivision load line.

(d) Each dead cover must be designed so that—

(1) It can be secured watertight; and

(2) It is not necessary to release any of the special nuts required in § 171.116(f)(4) in order to secure the dead cover.

§ 171.118 Automatic ventilators and side ports.

(a) An automatic ventilator must not be fitted in the side of a vessel below the bulkhead deck unless approved by the Commanding Officer, Marine Safety Center.

(b) The design and construction of each gangway, cargo and coaling port, and similar opening in the side of a vessel must be approved by the Commanding Officer, Marine Safety Center.

(c) In no case may the lowest point of any gangway, cargo and coaling port, or similar opening be below the deepest subdivision load line.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

§ 171.119 Openings below the weather deck in the side of a vessel less than 100 gross tons.

(a) If a vessel operates on exposed or partially protected waters, an opening port light is not permitted below the weather deck unless—

(1) The sill is at least 30 inches (76.2 centimeters) above the deepest subdivision load line; and

(2) It has an inside, hinged dead cover.

(b) Except for engine exhausts, each inlet or discharge pipe that penetrates the hull below a line drawn parallel to and at least 6 inches (15.2 centimeters) above the deepest subdivision load line must have means to prevent water from entering the vessel if the pipe fractures or otherwise fails.

(c) A positive action valve or cock that is located as close as possible to the hull is an acceptable means for complying with paragraph (b) of this section.

(d) If an inlet or discharge pipe is inaccessible, the means for complying with paragraph (b) of this section must be a shut-off valve that is—

(1) Operable from the weather deck or other accessible location above the bulkhead deck; and

(2) Labeled at the operating point for identity and direction of closing.

(e) Any connecting device or valve in a hull penetration must not be cast iron.

(f) Each plug cock in an inlet or discharge pipe must have a means, other than a cotter pin, to prevent its loosening or removal from the body.

[CGD 85-080, 62 FR 51353, Sept. 30, 1997]

Subpart G—Watertight Integrity Above the Margin Line

§ 171.120 Specific applicability.

Each vessel that is 100 gross tons or more must comply with § 171.122 and each vessel under 100 gross tons must comply with § 171.124.

[CGD 85–080, 62 FR 51354, Sept. 30, 1997]

§ 171.122 Watertight integrity above the margin line in a vessel of 100 gross tons or more.

(a) For the purpose of this section, a partial watertight bulkhead is one in which all portions are not watertight.

(b) Except as provided in paragraph (d) of this section, the bulkhead deck or a deck above it must be weather-tight.

(c) Partial watertight bulkheads or web frames must be located in the immediate vicinity of main transverse watertight bulkheads to minimize as much as practicable the entry and spread of water above the bulkhead deck.

(d) If a partial watertight bulkhead or web frame is located on the bulkhead deck in order to comply with paragraph (c) of this section, the joint between it and the shell and bulkhead deck must be watertight.

(e) If a partial watertight bulkhead does not line up with a main transverse watertight bulkhead below the bulkhead deck, the bulkhead deck between them must be watertight.

(f) Each opening in an exposed weather deck must—

(1) Have a coaming that complies with the height requirements in table 171.124(d); and

(2) Have a means for closing it weather-tight.

(g) Each port light located between the bulkhead deck and the next deck above the bulkhead deck must have an inside dead cover than can be secured watertight.

[CGD 79–023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 85–080, 61 FR 945, Jan. 10, 1996; 62 FR 51354, Sept. 30, 1997]

§ 171.124 Watertight integrity above the margin line in a vessel less than 100 gross tons.

(a) Each hatch exposed to the weather must be watertight; except that, the following hatches may be weather-tight:

(1) Each hatch on a watertight trunk that extends at least 12 inches (30.5 centimeters) above the weather deck.

(2) Each hatch in a cabin top.

(3) Each hatch on a vessel that operates only on protected waters.

(b) Each hatch cover must—

(1) Have securing devices; and

(2) Be attached to the hatch frame or coaming by hinges, captive chains, or to other devices to prevent its loss.

(c) Each hatch that provides access to crew or passenger accommodations must be operable from either side.

(d) Except as provided in paragraph (e) of this section, a weathertight door with permanent watertight coamings that comply with the height requirements in table 171.124(d) must be provided for each opening located in a deck house or companionway that—

(1) Gives access into the hull; and

(2) Is located in—

(i) A cockpit;

(ii) A well; or

(iii) An exposed location on a flush deck vessel.

TABLE 171.124(D)

Route	Height of coaming
Exposed or partially protected	6 inches (15.2 centimeters).
Protected	3 inches (7.6 centimeters).

(e) If an opening in a location specified in paragraph (d) of this section is provided with a Class 1 watertight door, the height of the watertight coaming need only be sufficient to accommodate the door.

[CGD 85–080, 62 FR 51354, Sept. 30, 1997]

Subpart H—Drainage of Weather Decks

§ 171.130 Specific applicability.

(a) Section 171.135 applies to each vessel that is 100 gross tons or more.

(b) Sections 171.140, 171.145, 171.150, and 171.155 apply to each vessel under 100 gross tons.

[CGD 79-023, 48 FR 51017, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 945, Jan. 10, 1996; 62 FR 51354, Sept. 30, 1997]

§ 171.135 Weather deck drainage on a vessel of 100 gross tons or more.

The weather deck must have freeing ports, open rails, and scuppers, as necessary, to allow rapid clearing of water under all weather conditions.

§ 171.140 Drainage of a flush deck vessel.

(a) Except as provided in paragraph (b) of this section, the weather deck on a flush deck vessel must be watertight and have no obstruction to overboard drainage.

(b) Each vessel with a flush deck may have solid bulwarks in the forward one-third length of the vessel if—

- (1) The bulwarks do not form a well enclosed on all sides; and
- (2) The foredeck of the vessel has sufficient sheer to ensure drainage aft.

[CGD 85-080, 62 FR 51354, Sept. 30, 1997]

§ 171.145 Drainage of a vessel with a cockpit.

(a) Except as follows, the cockpit must be watertight:

(1) A cockpit may have companionways if they comply with § 171.124(d).

(2) A cockpit may have ventilation openings along its inner periphery if—

- (i) The vessel operates only on protected or partially protected waters;
- (ii) The ventilation openings are located as high as possible in the side of the cockpit; and
- (iii) The height of the ventilation opening does not exceed 2 inches (5 centimeters).

(b) The cockpit must be designed to be self-bailing.

(c) Scuppers installed in a cockpit must be located to allow rapid clearing of water in all probable conditions of list and trim.

(d) Scuppers must have a combined area of at least the area given by either of the following equations:

$A = 0.1(D)$ square inches.

$A = 6.94(D)$ square centimeters.

Where—

A = the combined area of the scuppers in square inches (square centimeters).

D = the area of the cockpit in square feet (square meters).

(e) The cockpit deck of a vessel that operates on exposed or partially protected waters must be at least 10 inches (24.5 centimeters) above the deepest subdivision load line, unless the vessel complies with—

(1) The intact stability requirements of § 171.150;

(2) The Type II subdivision requirements in §§ 171.070, 171.072, and 171.073; and

(3) The damage stability requirements in § 171.080.

(f) The cockpit deck of all vessels that do not operate on exposed or partially protected waters must be located as high above the deepest subdivision load line as practicable.

[CGD 85-080, 62 FR 51354, Sept. 30, 1997]

§ 171.150 Drainage of a vessel with a well deck.

(a) Each well deck on a vessel must be watertight.

(b) Except as provided in paragraphs (c) and (d) of this section, the area required for freeing ports in the bulwarks that form a well must be determined as follows:

(1) If a vessel operates on exposed or partially protected waters, it must have at least 100 percent of the freeing port area derived from table 171.150.

(2) If a vessel operates only on protected or partially protected waters and complies with the requirements in the following sections for a vessel that operates on exposed waters, it must have at least 50 percent of the freeing port area derived from table 171.150:

(i) The intact stability requirements of § 171.030 or 171.050 and § 171.170.

(ii) The subdivision requirements of § 171.040, 171.043, or 171.070.

(iii) The damage stability requirements of § 171.080.

(3) If a vessel operates only on protected waters, the freeing port area must be at least equal to the scupper area required by § 171.145(d) for a cockpit of the same size.

(c) The freeing ports must be located to allow rapid clearing of water in all probable conditions of list and trim.

§ 171.155

(d) If a vessel that operates on exposed or partially protected waters does not have free drainage from the foredeck aft, then the freeing port area must be derived from table 171.150 using the entire bulwark length rather than the bulwark length in the after two-thirds of the vessel as stated in the table.

TABLE 171.150

Height of solid bulwark in inches (centimeters)	Freeing port area ¹²
6(15)	2(42.3)
12(30)	4(84.7)
18(46)	8(169.3)
24(61)	12(253.9)
30(76)	16(338.6)
36(91)	20(423.2)

¹ Intermediate values of freeing port area can be obtained by interpolation.

² In square inches per foot (square centimeters per meter) of bulwark length in the after 2/3 of the vessel.

[CGD 85-080, 62 FR 51354, Sept. 30, 1997]

§ 171.155 Drainage of an open boat.

The deck within the hull of an open boat must drain to the bilge. Overboard drainage of the deck is not permitted.

[CGD 85-080, 62 FR 51355, Sept. 30, 1997]

**PART 172—SPECIAL RULES
PERTAINING TO BULK CARGOES**

Subpart A—General

Sec.

172.005 Applicability.

Subpart B—Bulk Grain

172.010 Applicability.

172.015 Document of authorization.

172.020 Incorporation by reference.

172.030 Exemptions for certain vessels.

172.040 Certificate of loading.

Subpart C—Special Rules Pertaining to a Barge That Carries a Cargo Regulated Under Subchapter D of This Chapter

172.047 Specific applicability.

172.050 Damage stability.

Subpart D—Special Rules Pertaining to a Vessel That Carries a Cargo Regulated Under 33 CFR Part 157

172.060 Specific applicability.

172.065 Damage stability.

46 CFR Ch. I (10-1-98 Edition)

Subpart E—Special Rules Pertaining to a Barge That Carries a Hazardous Liquid Regulated Under Subchapter O of This Chapter

172.080 Specific applicability.

172.085 Hull type.

172.087 Cargo loading assumptions.

172.090 Intact transverse stability.

172.095 Intact longitudinal stability.

172.100 Watertight integrity.

172.103 Damage stability.

172.104 Character of damage.

172.105 Extent of damage.

172.110 Survival conditions.

Subpart F—Special Rules Pertaining to a Ship That Carries a Hazardous Liquid Regulated Under Subchapter O of This Chapter

172.125 Specific applicability.

172.127 Definitions.

172.130 Calculations.

172.133 Character of damage.

172.135 Extent of damage.

172.140 Permeability of spaces.

172.150 Survival conditions.

Subpart G—Special Rules Pertaining to a Ship That Carries a Bulk Liquefied Gas Regulated Under Subchapter O of This Chapter

172.155 Specific applicability.

172.160 Definitions.

172.165 Intact stability calculations.

172.170 Damage stability calculations.

172.175 Character of damage.

172.180 Extent of damage.

172.185 Permeability of spaces.

172.195 Survival conditions.

172.205 Local damage.

Subpart H—Special Rules Pertaining to Great Lakes Dry Bulk Cargo Vessels

172.215 Specific applicability.

172.220 Definitions.

172.225 Calculations.

172.230 Character of damage.

172.235 Extent of damage.

172.240 Permeability of spaces.

172.245 Survival conditions.

AUTHORITY: 46 U.S.C. 3306, 3703, 5115; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

SOURCE: CGD 79-023, 48 FR 51040, Nov. 4, 1983, unless otherwise noted.

Subpart A—General**172.005 Applicability.**

This part applies to each vessel that carries one of the following cargoes in bulk:

- (a) Grain.
- (b) A cargo listed in Table 30.25-1 of this chapter.
- (c) A cargo regulated under 33 CFR part 157.
- (d) A cargo listed in Table 151.01-10(b) of this chapter.
- (e) A cargo listed in Table I of part 153 of this chapter.
- (f) A cargo listed in Table 4 of part 154 of this chapter.
- (g) Any dry bulk cargo carried in a new Great Lakes vessel.

[CGD 79-023, 48 FR 51040, Nov. 4, 1983, as amended by CGD 80-159, 51 FR 33059, Sept. 18, 1986]

Subpart B—Bulk Grain

SOURCE: CGD 95-028, 62 FR 51218, Sept. 30, 1997, unless otherwise noted.

§ 172.010 Applicability.

This subpart applies to each vessel that loads grain in bulk, except vessels engaged solely on voyages on rivers, lakes, bays, and sounds or on voyages between Great Lake ports and St. Lawrence River ports as far east as a straight line drawn from Cape de Rosiers to West Point, Anticosti Island and as far east of a line drawn along the 63rd meridian from Anticosti Island to the north shore of the St. Lawrence River.

§ 172.015 Document of authorization.

(a) Except as specified in § 172.030, each vessel that loads grain in bulk must have a Document of Authorization issued in accordance with one of the following:

- (1) Section 3 of the International Code for the Safe Carriage of Grain in Bulk if the Document of Authorization is issued on or after January 1, 1994. As used in the Code, the term "Administration" means "U.S. Coast Guard".
- (2) Regulation 10 part (a) of the Annex to IMO Assembly resolution A.264(VIII) if the Document of Author-

ization was issued before January 1, 1994.

(b) The Commandant recognizes the National Cargo Bureau, Inc., 30 Vesey Street, New York, NY 10007-2914, for the purpose of issuing Documents of Authorization in accordance with paragraph (a)(1) of this section.

§ 172.020 Incorporation by reference.

(a) Certain material is incorporated by reference into this part under approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in paragraph (b) of this section, the Coast Guard must publish notice of change in the FEDERAL REGISTER; and the material must be made available to the public. All approved material is available for inspection at the Office of the Federal Register, 800 North Capitol Street NW., suite 700, Washington, DC 20002, and at the U.S. Coast Guard, Naval Architecture Division, Office of Design and Engineering Standards, 2100 Second Street SW., Washington, DC 20593-0001, and is available from the sources indicated in paragraph (b) of this section.

(b) The material approved for incorporation by reference in this part and the sections affected are as follows:

International Maritime Organization (IMO)

Publications Section, 4 Albert Embankment, London, SE1 7SR United Kingdom.

Amendment to Chapter VI of the International Convention for the Safety of Life at Sea, 1960, Resolution A.264(VIII)—172.015

Publication No. 240-E, International Code for the Safe Carriage of Grain in Bulk—172.015

[CGD 95-028, 62 FR 51218, Sept. 30, 1997, as amended by USCG 1998-4442, 63 FR 52192, Sept. 30, 1998]

§ 172.030 Exemptions for certain vessels.

(a) Vessels are exempt from 172.015 on voyages between:

- (1) United States ports along the East Coast as far south as Cape Henry, VA;
- (2) Wilmington, NC and Miami, FL;
- (3) United States ports in the Gulf of Mexico;

§ 172.040

(4) Puget Sound ports and Canadian west coast ports or Columbia River ports, or both;

(5) San Francisco, Los Angeles, and San Diego, CA.

(b) Vessels exempt by paragraph (a) of this section must comply with the following conditions:

(1) The master is satisfied that the vessel's longitudinal strength is not impaired.

(2) The master ascertains the weather to be encountered on the voyage.

(3) Potential heeling moments are reduced to a minimum by carrying as few slack holds as possible.

(4) Each slack surface must be leveled.

(5) The transverse metacentric height (GM), in meters, of the vessel throughout the voyage, after correction for liquid free surface, has been shown by stability calculations to be in excess of the required GM (GMR), in meters.

(i) The GMR is the sum of the increments of GM (GMI) multiplied by the correction factor, f and r .

Where: r = (available freeboard) (beam) of the vessel and

$f = 1$ if r is > 0.268 or

$f = (0.268 r)$ if r is < 0.268 .

(ii) The GMI for each compartment which has a slack surface of grain, i.e., is not trimmed full, is calculated by the following formula:

$GMI = (B3 \times L \times 0.0661) (\text{Disp.} \times SF)$
where: B = breadth of slack grain surface (m)

L = Length of compartment (m)

Disp. = Displacement of vessel (tons)

SF = Stowage factor of grain in compartment (cubic meters/tons)

(c) Vessels which do not have the Document of Authorization required by § 172.015 may carry grain in bulk up to one third of their deadweight tonnage provided the stability complies with the requirements of Section 9 of the International Code for the Safe Carriage of Grain in Bulk.

§ 172.040 Certificate of loading.

(a) Before it sails, each vessel that loads grain in bulk, except vessels engaged solely on voyages on the Great Lakes, rivers, or lakes, bays, and sounds, must have a certificate of loading issued by an organization recognized by the Commandant for that pur-

46 CFR Ch. I (10–1–98 Edition)

pose. The certificate of loading may be accepted as prima facie evidence of compliance with the regulations in this subpart.

(b) The Commandant recognizes the National Cargo Bureau, Inc., 30 Vesey Street, New York, NY, 10007-2914, for the purpose of issuing certificates of loading.

Subpart C—Special Rules Pertaining to a Barge That Carries a Cargo Regulated Under Subchapter D of This Chapter

§ 172.047 Specific applicability.

This section applies to each tank barge that carries, in independent tanks described in § 151.15-1(b) of this chapter, a cargo listed in Table 30.25-1 of this chapter that is a—

(a) Liquefied flammable gas; or

(b) Flammable liquid that has a Reid vapor pressure in excess of 25 pounds per square inch (172.4 KPa).

§ 172.050 Damage stability.

(a) Each tank barge is assigned a hull type number by the Commandant in accordance with § 32.63-5 of this chapter. The requirements in this section are specified according to the hull type number assigned.

(b) Except as provided in paragraph (c) of this section, each Type I and II barge hull must have a watertight weather deck.

(c) If a Type I or II barge hull has an open hopper, the fully loaded barge must be shown by design calculations to have at least 2 inches (50mm) of positive GM when the hopper space is flooded to the height of the weather deck.

(d) When demonstrating compliance with paragraph (c) of this section, credit may be given for the buoyancy of the immersed portion of cargo tanks if the tank securing devices are shown by design calculations to be strong enough to hold the tanks in place when they are subjected to the buoyant forces resulting from the water in the hopper.

(e) Each tank barge must be shown by design calculations to have at least 2 inches (50 mm) of positive GM in each condition of loading and operation after assuming the damage specified in

paragraph (f) of this section is applied in the following locations:

(1) *Type I barge hull not in an integrated tow.* If a Type I hull is required and the barge is not a box barge designed for use in an integrated tow, design calculations must show that the barge hull can survive damage at any location including on the intersection of a transverse and longitudinal watertight bulkhead.

(2) *Type I barge hull in an integrated tow.* If a Type I hull is required and the barge is a box barge designed for operation in an integrated tow, design calculations must show that the barge can survive damage—

(i) To any location on the bottom of the tank barge except on a transverse watertight bulkhead; and

(ii) To any location on the side of the tank barge including on a transverse watertight bulkhead.

(3) *Type II hull.* If a Type II hull is required, design calculations must show that the barge can survive damage to any location except to a transverse watertight bulkhead.

(f) For the purpose of paragraph (e) of this section—

(1) Design calculations must include both side and bottom damage, applied separately; and

(2) Damage must consist of the most disabling penetration up to and including penetrations having the following dimensions:

(i) Side damage must be assumed to be as follows:

(A) Longitudinal extent—6 feet (183 centimeters).

(B) Transverse extent—30 inches (76 centimeters).

(C) Vertical extent—from the baseline upward without limit.

(ii) Bottom damage must be assumed to be 15 inches (38.1 centimeters) from the baseline upward.

Subpart D—Special Rules Pertaining to a Vessel That Carries a Cargo Regulated Under 33 CFR Part 157

§ 172.060 Specific applicability.

This subpart applies to each U.S. tank vessel that is required to comply with 33 CFR 157.21.

[CGD 90-051, 57 FR 36246, Aug. 12, 1992]

§ 172.065 Damage stability.

(a) *Definitions.* As used in this section, *Length* or *L* means load line length (LLL).

(b) *Calculations.* Each tank vessel must be shown by design calculations to meet the survival conditions in paragraph (g) of this section in each condition of loading and operation except as specified in paragraph (c) of this section, assuming the damage specified in paragraph (d) of this section.

(c) *Conditions of loading and operation.* The design calculations required by paragraph (b) of this section need not be done for ballast conditions if the vessel is not carrying oil, other than oily residues, in cargo tanks.

(d) *Character of damage.* (1) If a tank vessel is longer than 738 feet (225 metes) in length, design calculations must show that it can survive damage at any location.

(2) If a tank vessel is longer than 492 feet (150 meters) in length, but not longer than 738 feet (225 meters), design calculations must show that it can survive damage at any location except the transverse bulkheads bounding an aft machinery space. The machinery space is calculated as a single floodable compartment.

(3) If a tank vessel is 492 feet (150 meters) or less in length, design calculations must show that it can survive damage—

(i) At any location between adjacent main transverse watertight bulkheads except to an aft machinery space;

(ii) To a main transverse watertight bulkhead spaced closer than the longitudinal extent of collision penetration specified in Table 172.065(a) from another main transverse watertight bulkhead; and

(iii) To a main transverse watertight bulkhead or a transverse watertight bulkhead bounding a side tank or double bottom tank if there is a step or a recess in the transverse bulkhead that is longer than 10 feet (3.05 meters) and that is located within the extent of penetration of assumed damage. The step formed by the after peak bulkhead and after peak tank top is not a step for the purpose of this regulation.

(e) *Extent of damage.* For the purpose of paragraph (b) of this section—

(1) Design calculations must include both side and bottom damage, applied separately; and

(2) Damage must consist of the penetrations having the dimensions given in Table 172.065(a) except that, if the most disabling penetrations would be less than the penetrations described in this paragraph, the smaller penetration must be assumed.

(f) *Permeability of spaces.* When doing the calculations required in paragraph (b) of this section—

(1) The permeability of a floodable space, other than a machinery space, must be as listed in Table 172.065(b);

(2) Calculations in which a machinery space is treated as a floodable space must be based on an assumed machinery space permeability of 85%, unless the use of an assumed permeability of less than 85% is justified in detail; and

(3) If a cargo tank would be penetrated under the assumed damage, the cargo tank must be assumed to lose all cargo and refill with salt water, or fresh water if the vessel operates solely on the Great Lakes, up to the level of the tank vessel's final equilibrium waterline.

(g) *Survival conditions.* A vessel is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(1) *Final waterline.* The final waterline, in the final condition of sinkage, heel, and trim, must be below the lower edge of an opening through which progressive flooding may take place, such

as an air pipe, or an opening that is closed by means of a weathertight door or hatch cover. This opening does not include an opening closed by a—

(i) Watertight manhole cover;

(ii) Flush scuttle;

(iii) Small watertight cargo tank hatch cover that maintains the high integrity of the deck;

(iv) Class 1 door in a watertight bulkhead within the superstructure;

(v) Remotely operated sliding watertight door; or

(vi) Side scuttle of the non-opening type.

(2) *Heel angle.* The maximum angle of heel must not exceed 25 degrees, except that this angle may be increased to 30 degrees if no deck edge immersion occurs.

(3) *Range of stability.* Through an angle of 20 degrees beyond its position of equilibrium after flooding, a tank vessel must meet the following conditions:

(i) The righting arm curve must be positive.

(ii) The maximum righting arm must be at least 3.94 inches (10 cm).

(iii) Each submerged opening must be weathertight.

(4) *Progressive flooding.* Pipes, ducts or tunnels within the assumed extent of damage must be either—

(i) Equipped with arrangements such as stop check valves to prevent progressive flooding to other spaces with which they connect; or

(ii) Assumed in the design calculations required in paragraph (b) of this section to permit progressive flooding to the spaces with which they connect.

(h) *Buoyancy of superstructure.* For the purpose of paragraph (b) of this section, the buoyancy of any superstructure directly above the side damage is to be disregarded. The unflooded parts of superstructures beyond the extent of damage may be taken into consideration if they are separated from the damaged space by watertight bulkheads and no progressive flooding of these intact spaces takes place.

TABLE 172.065(A)—EXTENT OF DAMAGE

COLLISION PENETRATION	
Longitudinal extent	$0.495L^{2/3}$ or 47.6 feet ($(1/3)L^{2/3}$ or 14.5m) whichever is shorter.
Transverse extent ¹	$B/5$ or 37.74 feet (11.5m) which is shorter.

TABLE 172.065(A)—EXTENT OF DAMAGE—
Continued

Vertical extent From the baseline upward without limit.

GROUNDING PENETRATION AT THE FORWARD END BUT EXCLUDING ANY DAMAGE AFT OF A POINT 0.3L AFT OF THE FORWARD PERPENDICULAR

Longitudinal extent $0.495L^{2/3}$ or 47.6 feet ($(1\frac{1}{3})L^{2/3}$ or 14.5m) whichever is shorter.Transverse extent $B/6$ or 32.81 feet (10m) whichever is shorter but not less than 16.41 feet (5m).Vertical extent from the baseline. $B/15$ or 19.7 feet (6m) whichever is shorter.

GROUNDING PENETRATION AT ANY OTHER LONGITUDINAL POSITION

Longitudinal extent $L/10$ or 16.41 feet (5m) whichever is shorter.

Transverse extent 16.41 feet (5m).

Vertical extent from the baseline. $B/15$ or 19.7 feet (6m) whichever is shorter.¹ Damage applied inboard from the vessel's side at right angles to the centerline at the level of the summer load line assigned under Subchapter E of this chapter.

TABLE 172.065(B)—PERMEABILITY

Spaces and tanks	Permeability (percent)
Storeroom spaces	60.
Accommodation spaces	95.
Voids	95.
Consumable liquid tanks	95 or 0. ¹
Other liquid tanks	95 or 0. ²

¹ Whichever results in the more disabling condition.² If tanks are partially filled, the permeability must be determined from the actual density and amount of liquid carried.

Subpart E—Special Rules Pertaining to a Barge That Carries a Hazardous Liquid Regulated Under Subchapter O of This Chapter

§ 172.080 Specific applicability.

This subpart applies to each tank barge that carries a cargo listed in Table 151.01–10(b) of this chapter.

§ 172.085 Hull type.

If a cargo listed in Table 151.05 of part 151 of this chapter is to be carried, the tank barge must be at least the hull type specified in Table 151.05 of this chapter for that cargo.

§ 172.087 Cargo loading assumptions.

(a) The calculations required in this subpart must be done for cargo weights and densities up to and including the maximum that is to be endorsed on the Certificate of Inspection in accordance with § 151.04–1(c) of this chapter.

(b) For each condition of loading and operation, each cargo tank must be assumed to have its maximum free surface.

§ 172.090 Intact transverse stability.

(a) Except as provided in paragraph (b) of this section, each tank barge must be shown by design calculations to have a righting arm curve with the following characteristics:

(1) If the tank barge is in river service, the area under the righting arm curve must be at least 5 foot-degrees (1.52 meter-degrees) up to the smallest of the following angles:

(i) The angle of maximum righting arm.

(ii) The downflooding angle.

(2) If the tank barge is in lakes, bays and sounds or Great Lakes summer service, the area under the righting arm curve must be at least 10 foot-degrees (3.05 meter-degrees) up to the smallest of the following angles:

(i) The angle of maximum righting arm.

(ii) The downflooding angle.

(3) If the tank barge is in ocean or Great Lakes winter service, the area under the righting arm curve must be at least 15 foot-degrees (4.57 meter-degrees) up to the smallest of the following angles:

(i) The angle of maximum righting arm.

(ii) The downflooding angle.

(b) If the vertical center of gravity of the cargo is below the weather deck at the side of the tank barge amidships, it must be shown by design calculations that the barge has at least the following metacentric height (GM) in feet (meters) in each condition of loading and operation:

$$GM = \frac{(K)(B)}{fe}$$

where—

K=0.3 for river service.

K=0.4 for lakes, bays and sounds and Great Lakes summer service.

K=0.5 for ocean and Great Lakes winter service.

B=beam in feet (meters).

fe=effective freeboard in feet (meters).

(c) The effective freeboard is given by—

§ 172.095

$f_e = f + f_a$; or

$f_e = d$, whichever is less.

where—

f = the freeboard to the deck edge amidships in feet (meters).

$f_a = (1.25)(a/L)((2b/B)-1)(h)$; or

$f_a = h$, whichever is less.

where—

a = trunk length in feet (meters).

L = LOA in feet (meters)

b = breadth of a watertight trunk in feet (meters).

B = beam of the barge in feet (meters).

h = height of a watertight trunk in feet (meters).

d = draft of the barge in feet (meters).

(d) For the purpose of this section, downflooding angle means the static angle from the intersection of the vessel's centerline and waterline in calm water to the first opening that does not close watertight automatically.

§ 172.095 Intact longitudinal stability.

Each tank barge must be shown by design calculations to have a longitudinal metacentric height (GM) in feet (meters) in each condition of loading and operation, at least equal to the following:

$$GM = \frac{0.02(L)^2}{d}$$

where—

L = LOA in feet (meters)

d = draft in feet (meters).

§ 172.100 Watertight integrity.

(a) Except as provided in paragraph (b) of this section, each Type I or II hopper barge hull must have a weather-tight weather deck.

(b) If a Type I or II barge hull has an open hopper, the fully loaded barge must be shown by design calculations to have at least 2 inches (50 mm) of positive GM when the hopper space is flooded to the height of the weather deck.

(c) When doing the calculations required by this section, credit may be given for the buoyancy of the immersed portion of cargo tanks if the tank securing devices are shown by design calculations to be strong enough to hold the tanks in place when they are subjected to the buoyant forces resulting from the water in the hopper.

§ 172.103 Damage stability.

Each tank barge must be shown by design calculations to meet the survival conditions in § 172.110 assuming the damage specified in § 172.104 to the hull type specified in Table 151.05 of part 151 of this chapter.

§ 172.104 Character of damage.

(a) *Type I barge hull not in an integrated tow.* If a Type I hull is required and the barge is not a box barge designed for use in an integrated tow, design calculations must show that the barge can survive damage at any location including the intersection of a transverse and a longitudinal bulkhead.

(b) *Type I barge hull in an integrated tow.* If a Type I barge hull is required and the barge is a box barge designed for operation in an integrated tow, design calculations must show that the barge can survive damage—

(1) At any location on the bottom of the tank barge except on a transverse watertight bulkhead; and

(2) At any location on the side of the tank barge including on a transverse watertight bulkhead.

(c) *Type II barge hull.* If a Type II hull is required, design calculations must show that a barge can survive damage at any location except on a transverse watertight bulkhead.

§ 172.105 Extent of damage.

For the purpose of § 172.103, design calculations must include both side and bottom damage, applied separately. Damage must consist of the most disabling penetration up to and including penetrations having the following dimensions:

(a) Side damage must be assumed to be as follows:

(1) Longitudinal extent—6 feet (183 centimeters).

(2) Transverse extent—30 inches (76 centimeters).

(3) Vertical extent—from the baseline upward without limit.

(b) Bottom damage must be assumed to be 15 inches (38 centimeters) from the baseline upward.

§ 172.110 Survival conditions.

(a) Paragraphs (c) and (d) of this section apply to a hopper barge and paragraphs (e) through (i) apply to all other tank barges.

(b) A barge is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(c) A hopper barge must not heel or trim beyond the angle at which—

(1) The deck edge is first submerged; or

(2) If the barge has a coaming that is at least 36 inches (91.5 centimeters) in height, the intersection of the deck and the coaming is first submerged, except as provided in paragraph (d) of this section.

(d) A hopper barge must not heel beyond the angle at which the deck edge is first submerged by more than “fa” as defined in § 172.090(c).

(e) Except as provided in paragraphs (h) and (i) of this section, each tank barge must not heel beyond the angle at which—

(1) The deck edge is first submerged; or

(2) If the barge has one or more watertight trunks, the deck edge is first submerged by more than “fa” as defined in § 172.090(c).

(f) Except as provided in paragraphs (h) and (i) of this section, a tank barge must not trim beyond the angle at which—

(1) The deck edge is first submerged; or

(2) If the barge has one or more watertight trunks, the intersection of the deck and the trunk is first submerged.

(g) If a tank barge experiences simultaneous heel and trim, the trim requirements in paragraph (f) of this section apply only at the centerline.

(h) Except as provided in paragraph (i) of this section, in no case may any part of the actual cargo tank top be underwater in the final condition of equilibrium.

(i) If a barge has a “step-down” in hull depth on either or both ends and all cargo tank openings are located on the higher deck level, the deck edge and tank top in the stepped-down area may be submerged.

Subpart F—Special Rules Pertaining to a Ship That Carries a Hazardous Liquid Regulated Under Subchapter O of This Chapter

§ 172.125 Specific applicability.

This subpart applies to each tankship that carries a cargo listed in Table I of part 153 of this chapter, except that it does not apply to a tankship whose cargo tanks are clean and gas free.

§ 172.127 Definitions.

Length or *L* means load line length (LLL).

§ 172.130 Calculations.

(a) Except as provided in § 153.7 of this chapter, each tankship must be shown by design calculations to meet the survival conditions in § 172.150 in each condition of loading and operation assuming the damage specified in § 172.133 for the hull type prescribed in part 153 of this chapter.

(b) If a cargo listed in Table I of part 153 of this chapter is to be carried, the vessel must be at least the hull type specified in part 153 of this chapter for that cargo.

[CGD 79-023, 48 FR 51040, Nov. 4, 1983, as amended by CGD 81-101, 52 FR 7799, Mar. 12, 1987]

§ 172.133 Character of damage.

(a) If a type I hull is required, design calculations must show that the vessel can survive damage at any location.

(b) Except as provided in § 153.7 of this chapter, if a type II hull is required, design calculations must show that a vessel—

(1) Longer than 492 feet (150 meters) in length can survive damage at any location; and

(2) Except as specified in paragraph (d) of this section, 492 feet (150 meters) or less in length can survive damage at any location.

(c) If a Type III hull is required, design calculations must show that a vessel—

(1) Except as specified in paragraph (d) of this section, 410 feet (125 meters) in length or longer can survive damage at any location; and

(2) Less than 410 feet (125 meters) in length can survive damage at any location except to an aft machinery space.

(d) A vessel described in paragraph (b)(2) or (c)(1) of this section need not be designed to survive damage to a main transverse watertight bulkhead bounding an aft machinery space. Except as provided in § 153.7 of this chapter, the machinery space must be calculated as a single floodable compartment.

[CGD 79–023, 48 FR 51040, Nov. 4, 1983, as amended by CGD 81–101, 52 FR 7799, Mar. 12, 1987]

§ 172.135 Extent of damage.

For the purpose of § 172.133—

(a) Design calculations must include both side and bottom damage, applied separately; and

(b) Damage must consist of the penetrations having the dimensions given in Table 172.135 except that, if the most disabling penetrations would be less than the penetrations given in Table 172.135, the smaller penetration must be assumed.

TABLE 172.135—EXTENT OF DAMAGE

COLLISION PENETRATION	
Longitudinal extent	$0.495L^{2/3}$ or 47.6 feet ($(1/3)L^{2/3}$ or 14.5m) whichever is shorter.
Transverse extent ¹	$B/5$ or 37.74 feet (11.5m) ² whichever is shorter.
Vertical extent	From the baseline upward without limit.
GROUNDING PENETRATION AT THE FORWARD END BUT EXCLUDING ANY DAMAGE AFT OF A POINT 0.3L AFT OF THE FORWARD PERPENDICULAR	
Longitudinal extent	$L/10$.
Transverse extent	$B/6$ or 32.81 feet (10m) whichever is shorter.
Vertical extent from the baseline upward.	$B/15$ or 19.7 feet (6m) whichever is shorter.
GROUNDING PENETRATION AT ANY OTHER LONGITUDINAL POSITION	
Longitudinal extent	$L/10$ or 16.41 feet (5m) whichever is shorter.
Transverse extent	16.41 feet (5m).
Vertical extent from the baseline upward.	$B/15$ or 19.7 feet (6m) whichever is shorter.

¹ Damage applied inboard from the vessel's side at right angles to the centerline at the level of the summer load line assigned under Subchapter E of this chapter.

² B is measured amidships.

§ 172.140 Permeability of spaces.

(a) When doing the calculations required in § 172.130, the permeability of a floodable space other than a machinery space must be as listed in Table 172.060(b).

(b) Calculations in which a machinery space is treated as a floodable space must be based on an assumed machinery space permeability of 0.85, unless the use of an assumed permeability of less than 0.85 is justified in detail.

(c) If a cargo tank would be penetrated under the assumed damage, the cargo tank must be assumed to lose all cargo and refill with salt water up to the level of the tankship's final equilibrium waterline.

§ 172.150 Survival conditions.

A tankship is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(a) *Final waterline.* The final waterline, in the final condition of sinkage, heel, and trim, must be below the lower edge of openings such as air pipes and openings closed by weathertight doors or hatch covers. The following types of openings may be submerged when the tankship is at the final waterline:

(1) Openings covered by watertight manhole covers or watertight flush scuttles.

(2) Small watertight cargo tank hatch covers.

(3) A Class 1 door in a watertight bulkhead within the superstructure.

(4) Remotely operated sliding watertight doors.

(5) Side scuttles of the non-opening type.

(b) *Heel angle.* (1) Except as described in paragraph (b)(2) of this section, the maximum angle of heel must not exceed 15 degrees (17 degrees if no part of the freeboard deck is immersed).

(2) The Commanding Officer, Marine Safety Center will consider on a case by case basis each vessel 492 feet (150 meters) or less in length having a final heel angle greater than 17 degrees but less than 25 degrees.

(c) *Range of stability.* Through an angle of 20 degrees beyond its position of equilibrium after flooding, a tankship must meet the following conditions:

(1) The righting arm curve must be positive.

(2) The maximum righting arm must be at least 3.95 inches (10 cm).

(3) Each submerged opening must be weathertight.

(d) *Progressive flooding.* Pipes, ducts or tunnels within the assumed extent of damage must be either—

(1) Equipped with arrangements such as stop check valves to prevent progressive flooding to other spaces with which they connect; or

(2) Assumed in the design calculations required by § 172.130 to flood the spaces with which they connect.

(e) *Buoyancy of superstructure.* The buoyancy of any superstructure directly above the side damage is to be disregarded. The unflooded parts of superstructures beyond the extent of damage may be taken into consideration if they are separated from the damaged space by watertight bulkheads and no progressive flooding of these intact spaces takes place.

(f) *Metacentric height.* After flooding, the tankship's metacentric height must be at least 2 inches (50mm) when the ship is in the upright position.

(g) *Equalization arrangements.* Flooding equalization arrangements requiring mechanical operation such as valves or cross-flooding lines may not be assumed to reduce the angle of heel. Spaces joined by ducts of large cross sectional area are treated as common spaces.

(h) *Intermediate stages of flooding.* If an intermediate stage of flooding is more critical than the final stage, the tankship must be shown by design calculations to meet the requirements in this section in the intermediate stage.

[CGD 79-023, 48 FR 51040, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

Subpart G—Special Rules Pertaining to a Ship That Carries a Bulk Liquefied Gas Regulated Under Subchapter O of This Chapter

§ 172.155 Specific applicability.

This subpart applies to each tankship that has on board a bulk liquefied gas listed in Table 4 of part 154 of this chapter as cargo, cargo residue, or vapor.

§ 172.160 Definitions.

As used in this subpart—

(a) *Length* or *L* means the load line length (LLL).

(b) *MARVS* means the Maximum Allowable Relief Valve Setting of a cargo tank.

§ 172.165 Intact stability calculations.

(a) Design calculations must show that 2 inches (50mm) of positive metacentric height can be maintained by each tankship when it is being loaded and unloaded.

(b) For the purpose of demonstrating compliance with the requirements of paragraph (a) of this section, the effects of the addition of water ballast may be considered.

§ 172.170 Damage stability calculations.

(a) Each tankship must be shown by design calculations to meet the survival conditions in § 172.195 in each condition of loading and operation assuming the damage specified in § 172.175 for the hull type specified in Table 4 of part 154 of this chapter.

(b) If a cargo listed in Table 4 of part 154 of this chapter is to be carried, the vessel must be at least the ship type specified in Table 4 of part 154 of this chapter for the cargo.

§ 172.175 Character of damage.

(a) If a type IG hull is required, design calculations must show that the vessel can survive damage at any location.

(b) If a type IIG hull is required, design calculations must show that a vessel—

(1) Longer than 492 feet (150 meters) in length can survive damage at any location; and

(2) 492 feet (150 meters) or less in length can survive damage at any location except the transverse bulkheads bounding an aft machinery space. The machinery space is calculated as a single floodable compartment.

(c) If a vessel has independent tanks type C with a MARVS of 100 psi (689 kPa) gauge or greater, is 492 feet (150 meters) or less in length, and Table 4 of part 154 of this chapter allows a type IIPG hull, design calculations must show that the vessel can survive damage at any location, except as prescribed in paragraph (e) of this section.

§ 172.180

46 CFR Ch. I (10–1–98 Edition)

(d) If a type IIIG hull is required, except as specified in paragraph (e) of this section, design calculations must show that a vessel—

(1) 410 feet (125 meters) in length or longer can survive damage at any location; and

(2) Less than 410 feet (125 meters) in length can survive damage at any location, except in the main machinery space.

(e) The calculations in paragraphs (c) and (d) of this section need not assume damage to a transverse bulkhead unless it is spaced closer than the longitudinal extent of collision penetration specified in Table 172.180 from another transverse bulkhead.

(f) If a main transverse watertight bulkhead or transverse watertight bulkhead bounding a side tank or double bottom tank has a step or a recess that is longer than 10 feet (3.05 meters) located within the extent of penetration of assumed damage, the vessel must be shown by design calculations to survive damage to this bulkhead. The step formed by the after peak bulkhead and after peak tank top is not a step for the purpose of this regulation.

§ 172.180 Extent of damage.

For the purpose of § 172.170—

(a) Design calculations must include both side and bottom damage, applied separately; and

(b) Damage must consist of the penetrations having the dimensions given in Table 172.180 except that, if the most disabling penetrations would be less than the penetrations given in Table 172.180, the smaller penetration must be assumed.

TABLE 172.180—EXTENT OF DAMAGE

COLLISION PENETRATION	
Longitudinal extent	$0.495L^{2/3}$ or 47.6 feet ($((1/3)L)^{2/3}$ or 14.5m) whichever is shorter.
Transverse extent ¹	$B/5$ or 37.74 feet (11.5m) ² whichever is shorter.
Vertical extent	From the baseline upward without limit.
GROUNDING PENETRATION AT THE FORWARD END BUT EXCLUDING ANY DAMAGE AFT OF A POINT 0.3L AFT OF THE FORWARD PERPENDICULAR	
Longitudinal extent	$0.495L^{2/3}$ or 47.6 feet ($((1/3)L)^{2/3}$ or 14.5m) whichever is shorter.
Transverse extent	$B/6$ or 32.81 feet (10m) whichever is shorter.

TABLE 172.180—EXTENT OF DAMAGE—
Continued

Vertical extent from the molded line of the shell at the centerline.	$B/15$ or 6.6 feet (2m) whichever is shorter.
GROUNDING PENETRATION AT ANY OTHER LONGITUDINAL POSITION	
Longitudinal extent	$L/10$ or 16.41 feet (5m) whichever is shorter.
Transverse extent	$B/6$ or 16.41 feet (5m) whichever is shorter.
Vertical extent from the molded line of the shell at the centerline.	$B/15$ or 6.6 feet (2m) whichever is shorter.

¹ Damage applied inboard from the vessel's side at right angles to the centerline at the level of the summer load line assigned under Subchapter E of this chapter.

² B is measured amidships.

§ 172.185 Permeability of spaces.

(a) When doing the calculations required in § 172.170, the permeability of a floodable space other than a machinery space must be as listed in Table 172.060(b).

(b) Calculations in which a machinery space is treated as a floodable space must be based on an assumed machinery space permeability of 85%, unless the use of an assumed permeability of less than 85% is justified in detail.

(c) If a cargo tank would be penetrated under the assumed damage, the cargo tank must be assumed to lose all cargo and refill with salt water up to the level of the tankship's final equilibrium waterline.

§ 172.195 Survival conditions.

A vessel is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(a) *Final waterline.* The final waterline, in the final condition of sinkage, heel, and trim, must be below the lower edge of an opening through which progressive flooding may take place, such as an air pipe, or an opening that is closed by means of a weathertight door or hatch cover. This opening does not include an opening closed by a—

- (1) Watertight manhole cover;
- (2) Flush scuttle;
- (3) Small watertight cargo tank hatch cover that maintains the high integrity of the deck;
- (4) A Class 1 door in a watertight bulkhead within the superstructure;
- (5) Remotely operated sliding watertight door; or

(6) A side scuttle of the non-opening type.

(b) *Heel angle.* The maximum angle of heel must not exceed 30 degrees.

(c) *Range of stability.* Through an angle of 20 degrees beyond its position of equilibrium after flooding, a tankship must meet the following conditions:

(1) The righting arm curve must be positive.

(2) The maximum righting arm must be at least 3.94 inches (10 cm).

(3) Each submerged opening must be weathertight.

(d) *Progressive flooding.* If pipes, ducts, or tunnels are within the assumed extent of damage, arrangements must be made to prevent progressive flooding to a space that is not assumed to be flooded in the damaged stability calculations.

(e) *Buoyancy of superstructure.* The buoyancy of any superstructure directly above the side damage is to be disregarded. The unflooded parts of superstructures beyond the extent of damage may be taken into consideration if they are separated from the damaged space by watertight bulkheads and no progressive flooding of these intact spaces takes place.

(f) *Metacentric height.* After flooding, the tank ship's metacentric height must be at least 2 inches (50 mm) when the vessel is in the upright position.

(g) *Equalization arrangements.* Equalization arrangements requiring mechanical aids such as valves or cross-flooding lines may not be considered for reducing the angle of heel. Spaces joined by ducts of large cross-sectional area are treated as common spaces.

(h) *Intermediate stages of flooding.* If an intermediate stage of flooding is more critical than the final stage, the tank vessel must be shown by design calculations to meet the requirements in this section in the intermediate stage.

§ 172.205 Local damage.

(a) Each tankship must be shown by design calculations to meet the survival conditions in paragraph (b) of this section in each condition of loading and operation assuming that local damage extending 30 inches (76 cm)

normal to the hull shell is applied at any location in the cargo length:

(b) The vessel is presumed to survive assumed local damage if it does not heel beyond the smaller of the following angles in the final stage of flooding:

(1) 30 degrees.

(2) The angle at which restoration of propulsion and steering, and use of the ballast system is precluded.

Subpart H—Special Rules Pertaining to Great Lakes Dry Bulk Cargo Vessels

SOURCE: CGD 80-159, 51 FR 33059, Sept. 18, 1986, unless otherwise noted.

§ 172.215 Specific applicability.

This subpart applies to each new Great Lakes vessel of 1600 gross tons or more carrying dry cargo in bulk.

§ 172.220 Definitions.

(a) As used in this subpart *Length (L)*, *Breadth (B)*, and *Molded Depth (D)* are as defined in § 45.3 of this chapter.

(b) As used in this part *new Great Lakes Vessel* means a vessel operating solely within the limits of the Great Lakes as defined in this subchapter that:

(1) Was contracted for on or after November 17, 1986, or delivered on or after November 17, 1988.

(2) Has undergone a major conversion under a contract made on or after November 17, 1986, or completed a major conversion on or after November 17, 1987.

CGD 80-159, 51 FR 33059, Sept. 18, 1986]

§ 172.225 Calculations.

(a) Each vessel must be shown by design calculations to meet the survival conditions in § 172.245 in each condition of loading and operation, assuming the damage specified in § 172.230.

(b) When doing the calculations required by paragraph (a) of this section, the virtual increase in the vertical center of gravity due to a liquid in a space must be determined by calculating either—

(1) The free surface effect of the liquid with the vessel assumed heeled five degrees from the vertical; or

(2) The shift of the center of gravity of the liquid by the moment of transference method.

(c) In calculating the free surface effect of consumable liquids, it must be assumed that, for each type of liquid, at least one transverse pair of wing tanks or a single centerline tank has a free surface. The tank or combination of tanks selected must be those having the greatest free surface effect.

(d) When doing the calculations required by paragraph (a) of this section, the buoyancy of any superstructure directly above the side damage must not be considered. The unflooded parts of superstructures beyond the extent of damage may be considered if they are separated from the damaged space by watertight bulkheads and no progressive flooding of these intact spaces takes place.

§ 172.230 Character of damage.

(a) Design calculations must show that each vessel can survive damage—

(1) To any location between adjacent main transverse watertight bulkheads;

(2) To any location between a main transverse bulkhead and a partial transverse bulkhead in way of a side wing tank;

(3) To a main or wing tank transverse watertight bulkhead spaced closer than the longitudinal extent of collision penetration specified in Table 172.235 to another main transverse watertight bulkhead; and

(4) To a main transverse watertight bulkhead or a transverse watertight bulkhead bounding a side tank or double bottom tank if there is a step or a recess in the transverse bulkhead that is longer than 10 feet (3.05 meters) and that is located within the extent of penetration of assumed damage. The step formed by the after peak bulkhead and after peak tank top is not a step for the purpose of this paragraph.

§ 172.235 Extent of damage.

For the purpose of the calculations required in § 172.225—

(a) Design calculations must include both side and bottom damage, applied separately; and

(b) Damage must consist of the penetrations having the dimensions given in Table 172.235 except that, if the most

disabling penetrations would be less than the penetrations described in this paragraph, the smaller penetration must be assumed.

TABLE 172.235—EXTENT OF DAMAGE

Collision Penetration	
Longitudinal extent	0.495 $L^{2/3}$ or 47.6 feet. ($1/3 L^{2/3}$ or 14.5 m), whichever is less.
Transverse extent	4 feet 2 inches (1.25 m). ¹
Vertical extent	From the baseline upward without limit.
Grounding Penetration Forward of a Point 0.3L Aft of the Forward Perpendicular	
Longitudinal	0.495 $L^{2/3}$ or 47.6 feet. ($1/3 L^{2/3}$ or 14.5 m), whichever is less.
Transverse	B/6 or 32.8 feet (10 m), whichever is less, but not less than 16.4 feet (5 m). ¹
Vertical extent	0.75 m from the baseline.
Grounding Penetration at Any Other Longitudinal Position	
Longitudinal extent	L/10 or 16.4 feet (5 m), whichever is less.
Transverse	4 feet 2 inches (1.25 m).
Vertical extent	2 feet 6 inches (0.75 m) from the baseline.

¹ Damage applied inboard from the vessel's side at right angles to the centerline at the level of the summer load line assigned under Subchapter E of this chapter.

§ 172.240 Permeability of spaces.

When doing the calculations required in § 172.225,

(a) The permeability of a floodable space, other than a machinery or cargo space, must be assumed as listed in Table 172.240;

(b) Calculations in which a machinery space is treated as a floodable space must be based on an assumed machinery space permeability of 85% unless the use of an assumed permeability of less than 85% is justified in detail; and

(c) Calculations in which a cargo space that is completely filled is considered flooded must be based on an assumed cargo space permeability of 60% unless the use of an assumed permeability of less than 60% is justified in detail. If the cargo space is not completely filled, a cargo space permeability of 95% must be assumed unless the use of an assumed permeability of less than 95% is justified in detail.

TABLE 172.240—PERMEABILITY

Spaces and tanks	Permeability (per-cent)
Storeroom spaces	60
Accommodations spaces	95
Voids	95
Consumable liquid tanks	¹ 95 or 0
Other liquid tanks	² 95 or 0
Cargo (completely filled)	60
Cargo (empty)	95
Machinery	85

¹ Whichever results in the more disabling condition.

² If tanks are partially filled, the permeability must be determined from the actual density and amount of liquid carried.

§ 172.245 Survival conditions.

A vessel is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(a) *Final waterline.* The final waterline, in the final condition of sinkage, heel, and trim must be below the lower edge of an opening through which progressive flooding may take place, such as an air pipe, or an opening that is closed by means of a weathertight door or hatch cover. This opening does not include an opening closed by a:

- (1) Watertight manhole cover;
- (2) Flush scuttle;
- (3) Small watertight cargo tank hatch cover that maintains the high integrity of the deck;
- (4) Class 1 door in a watertight bulkhead;
- (5) Remotely operated sliding watertight door;
- (6) Side scuttle of the nonopening type;
- (7) Retractable inflatable seal; or
- (8) Guillotine door.

(b) *Heel angle.* The maximum angle of heel must not exceed 15 degrees, except that this angle may be increased to 17 degrees if no deck edge immersion occurs.

(c) *Range of stability.* Through an angle of 20 degrees beyond its position of equilibrium after flooding, a vessel must meet the following conditions:

- (1) The righting arm curve must be positive.
- (2) The maximum righting arm must be at least 4 inches (10 cm).
- (3) Each submerged opening must be weathertight

(d) *Metacentric height.* After flooding, the metacentric height must be at least 2 inches (50 mm) when the vessel is in the equilibrium position.

(e) *Progressive flooding.* In the design calculations required by § 172.225, progressive flooding between spaces connected by pipes, ducts or tunnels must be assumed unless:

(1) Pipes within the assumed extent of damage are equipped with arrangements such as stop check valves to prevent progressive flooding to other spaces with which they connect; and,

(2) Progressive flooding through ducts or tunnels is protected against by:

- (i) Retractable inflatable seals to cargo hopper gates; or
- (ii) Guillotine doors in bulkheads in way of the conveyor belt.

PART 173—SPECIAL RULES PERTAINING TO VESSEL USE

Subpart A—General

Sec.

173.001 Applicability.

Subpart B—Lifting

173.005 Specific applicability.

173.007 Location of the hook load.

173.010 Definitions.

173.020 Intact stability standards: Counterballasted and non-counterballasted vessels.

173.025 Additional intact stability standards: Counterballasted vessels.

Subpart C—School Ships

173.050 Specific applicability.

173.051 Public nautical school ships.

173.052 Civilian nautical school ships.

173.053 Sailing school vessels.

173.054 Watertight subdivision and damage stability standards for new sailing school vessels.

173.055 Watertight subdivision and damage stability standards for existing sailing school vessels.

173.056 Collision and other watertight bulkheads.

173.057 Permitted locations for Class I watertight doors.

173.058 Double bottom requirements.

173.059 Penetrations and openings in watertight bulkheads.

173.060 Openings in the side of a vessel below the bulkhead or weather deck.

173.061 Watertight integrity above the margin line.

173.062 Drainage of weather deck.

173.063 Intact stability requirements.

§ 173.001

Subpart D—Oceanographic Research

- 173.070 Specific applicability.
- 173.075 Subdivision requirements.
- 173.080 Damage stability requirements.
- 173.085 General subdivision requirements.

Subpart E—Towing

- 173.090 General.
- 173.095 Towline pull criterion.

AUTHORITY: 43 U.S.C. 1333; 46 U.S.C. 2113, 3306, 5115; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

SOURCE: CGD 79-023, 48 FR 51045, Nov. 4, 1983, unless otherwise noted.

Subpart A—General

§ 173.001 Applicability.

Each vessel that is engaged in one of the following activities must comply with the applicable provisions of this part:

- (a) Lifting.
- (b) Training (schoolship).
- (c) Oceanographic research.
- (d) Towing.

Subpart B—Lifting

§ 173.005 Specific applicability.

This subpart applies to each vessel that—

- (a) Is equipped to lift cargo or other objects; and
- (b) Has a maximum heeling moment due to hook load greater than or equal to—

$(0.67)(W)(GM)(F/B)$ in meter-metric tons (foot-long tons), where—

W=displacement of the vessel with the hook load included in metric (long) tons.

GM=metacentric height with hook load included in meters (feet).

F=freeboard to the deck edge amidships in meters (feet).

B=beam in meters (feet).

[CGD 79-023, 48 FR 51045, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 945, Jan. 10, 1996]

§ 173.007 Location of the hook load.

When doing the calculations required in this subpart, the hook load must be considered to be located at the head of the crane.

§ 173.010 Definitions.

As used in this part—

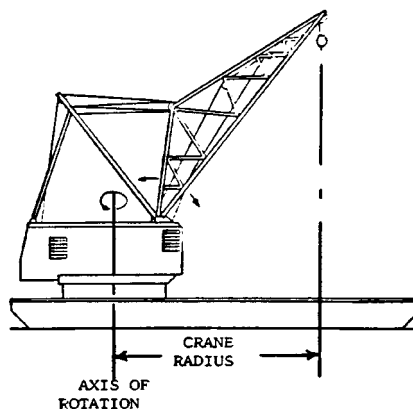
46 CFR Ch. I (10-1-98 Edition)

(a) *Hook load* means the weight of the object lifted by the crane.

(b) *Crane radius* means the distance illustrated in Figure 173.010.

Figure 173.010

Crane Radius



§ 173.020 Intact stability standards: Counterballasted and non-counterballasted vessels.

(a) Except as provided in paragraph (c) of this section, each vessel that is not equipped to counter-ballast while lifting must be shown by design calculations to comply with this section in each condition of loading and operation and at each combination of hook load and crane radius.

(b) Each vessel must have a righting arm curve with the following characteristics:

(1) If the vessel operates in protected or partially protected waters, the area under the righting arm curve up to the smallest of the following angles must be at least 10 foot-degrees (3.05 meter-degrees):

- (i) The angle corresponding to the maximum righting arm.
- (ii) The downflooding angle.
- (iii) 40 degrees.

(2) If the vessel operates in exposed waters, the area under the righting arm curve up to the smallest of the following angles must be at least 15 foot-degrees (4.57 meter-degrees):

- (i) The angle corresponding to the maximum righting arm.
- (ii) The downflooding angle.

(iii) 40 degrees.

(c) If the vessel's hull proportions fall within all three of the following limits, in lieu of complying with paragraph (b) of this section, the vessel owner may demonstrate in the presence of the OCMI that the vessel will not heel beyond the limits specified in paragraph (d) of this section:

- (1) Beam to depth—3.40 to 4.75.
- (2) Length to beam—3.20 to 4.50.
- (3) Draft to depth—0.60 to 0.85.

(d) For the purpose of paragraph (c) of this section, the following limits of heel apply with the vessel at its deepest operating draft:

(1) Protected and partially protected waters and Great Lakes in summer—heel to main deck immersion or bilge emergence, whichever occurs first.

(2) Exposed waters and Great Lakes in winter—heel permitted to one-half of the freeboard or one-half of the draft, whichever occurs first.

[CGD 79-023, 48 FR 51045, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 945, Jan. 10, 1996]

§ 173.025 Additional intact stability standards: Counterballasted vessels.

(a) Each vessel equipped to counterballast while lifting must be shown by design calculations to be able to withstand the sudden loss of the hook load, in each condition of loading and operation and at each combination of hook load and crane radius.

(b) When doing the calculations required by this section, the hook load and counterballast heeling arms and vessel righting arms, as plotted on graph 173.025, must define areas that satisfy the following equation:

$\text{Area II} > \text{Area I} + K$

Where—

(1) $K=0$ for operation on protected waters and 7 foot-degrees (2.13 meter-degrees) for operation on partially protected and exposed waters.

(2) Areas I and II are shown on graph 173.025.

(c) Each heeling arm curve must be defined by—

$HA = HAO \cos (T)$

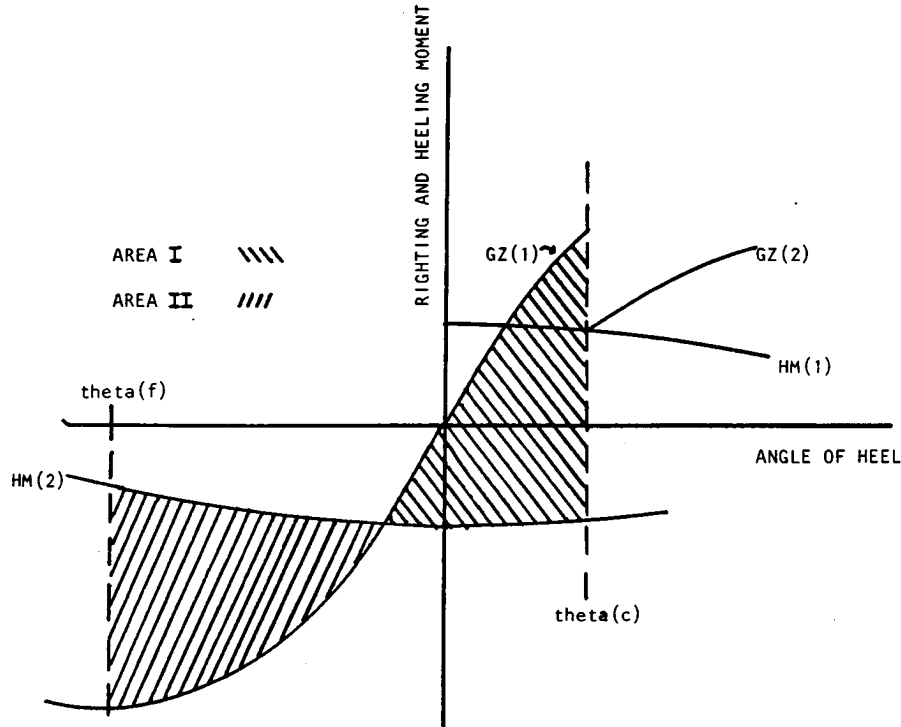
Where—

HA=heeling arm.

HAO=heeling arm at 0 degrees of heel.

T=angle of heel.

GRAPH 173.025



Where—

GZ(1) is the righting arm curve at the displacement corresponding to the vessel without hooking load.

GZ(2) is the righting arm curve at the displacement corresponding to the vessel with hook load.

HA(1) is the heeling arm due to the combined heeling moments of the hook load and the counterballast at the displacement with hook load.

HA(2) is the heeling arm due to the counterballast at the displacement without hook load.

Theta(c) is the angle of static equilibrium due to the combined hook load and counterballast heeling moments.

Theta(f) is the downflooding angle on the counterballasted side of the vessel.

[CGD 79-023, 48 FR 51045, Nov. 4, 1983, as amended by CGD 85-080, 61 FR 945, Jan. 10, 1996]

Subpart C—School Ships

§ 173.050 Specific applicability.

Each nautical school ship, inspected under Subchapter R of this chapter, must comply with this subpart.

§ 173.051 Public nautical school ships.

Each public nautical school ship must comply with—

- (a) Section 171.070(a) of this subchapter as a passenger vessel carrying 400 or less passengers;
- (b) Section 171.070(e) of this subchapter;
- (c) Section 171.072 of this subchapter; and
- (d) Section 171.073 of this subchapter.

[CGD 79-023, 48 FR 51045, Nov. 4, 1983. Redesignated by CGD 83-005, 51 FR 924, Jan. 9, 1986]

§ 173.052 Civilian nautical school ships.

Each civilian nautical school ship must comply with part 171 of this subchapter as though it were a passenger vessel. In addition to regular passengers, for the purpose of complying with part 171, the following will also count as passengers;

- (a) A student.
- (b) A cadet.
- (c) An instructor who is not also a member of the crew.

[CGD 79-023, 48 FR 51045, Nov. 4, 1983. Redesignated by CGD 83-005, 51 FR 924, Jan. 9, 1986]

§ 173.053 Sailing school vessels.

(a) In addition to the requirements in §§ 173.054 through 173.063, each sailing school vessel must comply with the provisions of subpart A of part 171 of this subchapter.

(b) In addition to regular passengers, for the purpose of complying with §§ 171.070 through 171.073 and § 171.080, the following will also be counted as passengers:

- (1) Sailing school students.
- (2) Sailing school instructors.
- (3) Guests.

[CGD 83-005, 51 FR 924, Jan. 9, 1986]

§ 173.054 Watertight subdivision and damage stability standards for new sailing school vessels.

(a) Each new sailing school vessel which has a mean length greater than 75 feet (22.8 meters) or which carries more than 30 persons must comply with—

- (1) Section 179.210(a) of this chapter;
- (2) Sections 171.070 through 171.073; and
- (3) Section 171.080 for Type II subdivision and damage stability.

(b) Each new sailing school vessel which has a mean length of 75 feet (22.8 meters) or less and carries more than 30 persons must comply with either—

- (1) Section 179.210(a) of this chapter and § 179.220 of this chapter; or
- (2) Section 171.040(a)(1), §§ 171.070 through 171.073, and § 171.080.

(c) Each new sailing school vessel which does not carry more than 30 persons must have a collision bulkhead unless it has a mean length less than 40 feet (12.2 meters) and is certificated for

protected or partially protected waters service only.

[CGD 83-005, 51 FR 924, Jan. 9, 1986, as amended by CGD 85-080, 61 FR 946, Jan. 10, 1996]

§ 173.055 Watertight subdivision and damage stability standards for existing sailing school vessels.

(a) Except as provided in paragraph (c) of this section, an existing sailing school vessel which carries more than 49 persons must be fitted with a collision bulkhead and any additional bulkheads necessary to provide one compartment subdivision.

(b) Except as provided in paragraph (c) of this section, an existing sailing school vessel which has a mean length greater than 65 feet (19.8 meters), must be fitted with additional transverse watertight bulkheads necessary to provide one compartment subdivision, when the following Subdivision Numerals are exceeded:

(1) For vessels to be operated on Exposed Waters:

$$L \times N > 4000$$

(2) For vessels to be operated on Partially Protected Waters:

$$L \times N > 4500$$

(3) For vessels to be operated on Protected Waters:

$$L \times N > 5000$$

where L is the mean length and N is the number of persons on board

(c) An existing sailing school vessel which is required to meet a one compartment subdivision standard and has a mean length of 90 feet (27.4 meters) or less may, instead of one compartment subdivision, be fitted with a collision bulkhead and sufficient air tankage or other internal buoyancy to maintain the fully-loaded vessel afloat with positive stability in the flooded condition.

(d) Except as provided in paragraph (e) of this section, an existing sailing school vessel which has a mean length greater than 65 feet (19.8 meters) must be fitted with a collision bulkhead.

(e) On an existing sailing school vessel, operating on protected waters, which has a mean length of 90 feet (27.4 meters) or less with no other requirement for subdivision, the collision bulkhead may be omitted.

§ 173.056

(f) An existing sailing school vessel, operating on exposed waters, which has a mean length of 65 feet (19.8 meters) or less and is carrying more than 15 persons, must be fitted with a collision bulkhead.

[CGD 83-005, 51 FR 924, Jan. 9, 1986]

§ 173.056 Collision and other watertight bulkheads.

(a) Collision bulkheads required by this section must comply with the requirements in § 171.085 of this subchapter.

(b) Each sailing school vessel required to meet paragraph (a) of § 173.054 must comply with the machinery space bulkhead requirements in § 171.095 of this subchapter.

[CGD 83-005, 51 FR 924, Jan. 9, 1986]

§ 173.057 Permitted locations for Class I watertight doors.

(a) Class I doors are permitted in any location on a sailing school vessel which has a mean length of 125 feet (38.1 meters) or less.

(b) Class I doors fitted in accordance with § 170.270 of this subchapter shall additionally be marked in two-inch letters "RECLOSE AFTER USE", and be provided with a remote position indicator at the main navigating station of the vessel.

[CGD 83-005, 51 FR 924, Jan. 9, 1986]

§ 173.058 Double bottom requirements.

Each new sailing school vessel which has a mean length greater than 165 feet (50.3 meters) and is certificated for exposed water service must comply with the double bottom requirements in §§ 171.105 through 171.109, inclusive, of this subchapter.

[CGD 83-005, 51 FR 924, Jan. 9, 1986]

§ 173.059 Penetrations and openings in watertight bulkheads.

Penetrations and openings in watertight bulkheads must comply with the requirements in subpart E of part 171 of this subchapter or §§ 179.320, 179.330, and 179.340 in subchapter T of this chapter.

[CGD 83-005, 51 FR 924, Jan. 9, 1986, as amended by CGD 85-080, 61 FR 946, Jan. 10, 1996]

46 CFR Ch. I (10-1-98 Edition)

§ 173.060 Openings in the side of a vessel below the bulkhead or weather deck.

(a) Openings in the side of a vessel below the bulkhead or weather deck must comply with the requirements in subpart F of part 171 of this subchapter or § 179.350 in subchapter T of this chapter.

(b) In addition to the requirements in paragraph (a) of this section, each sailing school vessel which has a mean length greater than 90 feet must comply with the requirements in § 56.50-95 of Subchapter F of this chapter.

[CGD 83-005, 51 FR 924, Jan. 9, 1986, as amended by CGD 85-080, 61 FR 945, Jan. 10, 1996]

§ 173.061 Watertight integrity above the margin line.

The watertight integrity of each sailing school vessel above the margin line must comply with the requirements in subpart G of part 171 of this subchapter or § 179.360 in subchapter T of this chapter.

[CGD 83-005, 51 FR 925, Jan. 9, 1986, as amended by CGD 85-080, 61 FR 946, Jan. 10, 1996; 61 FR 20556, May 7, 1996]

§ 173.062 Drainage of weather deck.

The weather deck of each sailing school vessel must be provided with drainage in accordance with the requirements in subpart H of part 171 of this subchapter or subpart D of part 178 in subchapter T of this chapter.

[CGD 83-005, 51 FR 925, Jan. 9, 1986, as amended by CGD 85-080, 61 FR 946, Jan. 10, 1996]

§ 173.063 Intact stability requirements.

(a) Except as provided in this section, each sailing school vessel must meet the intact stability requirements in §§ 170.170, 171.050, and 171.055 of this chapter.

(b) In applying the requirements in §§ 170.170 and 171.050 of this subchapter, the value of "T" is equal to the angle of heel at which the deck edge is immersed or $\frac{1}{3}$ of the downflooding angle, whichever is less.

(c) In applying the requirements of § 171.055(d) (1) and (2) of this subchapter—

(i) The value "X" is equal to 0.6 long tons/square foot (9.8 metric tons/square meter).

Coast Guard, DOT

§ 173.063

(2) For a vessel in service on protected or partially protected waters, values "Y" and "Z" are determined from graphs 173.063 (a) and (b) and multiplied by the multiplier in graph 173.063(e).

(3) For a vessel in service on exposed waters, "Y" and "Z" are determined from graphs 173.063 (c) and (d) and multiplied by the multiplier from graph 173.063(e).

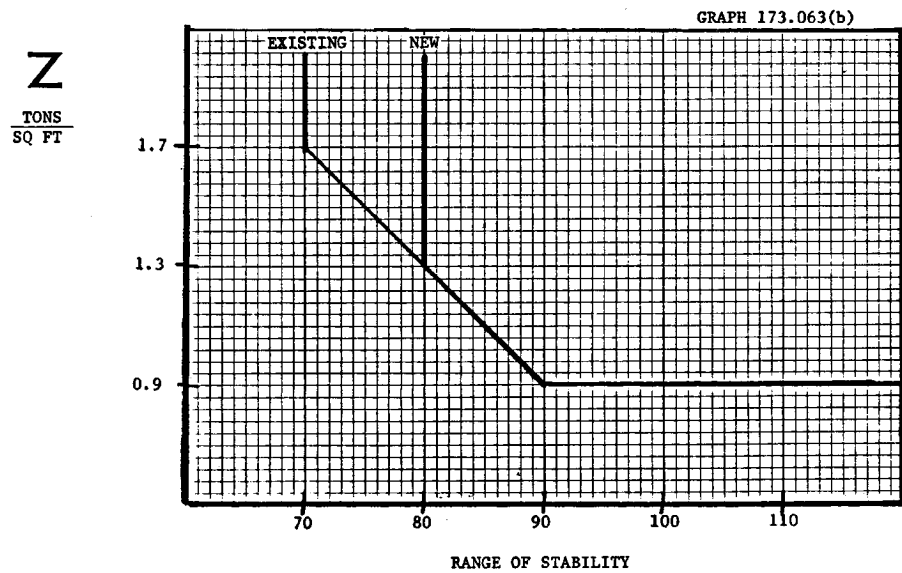
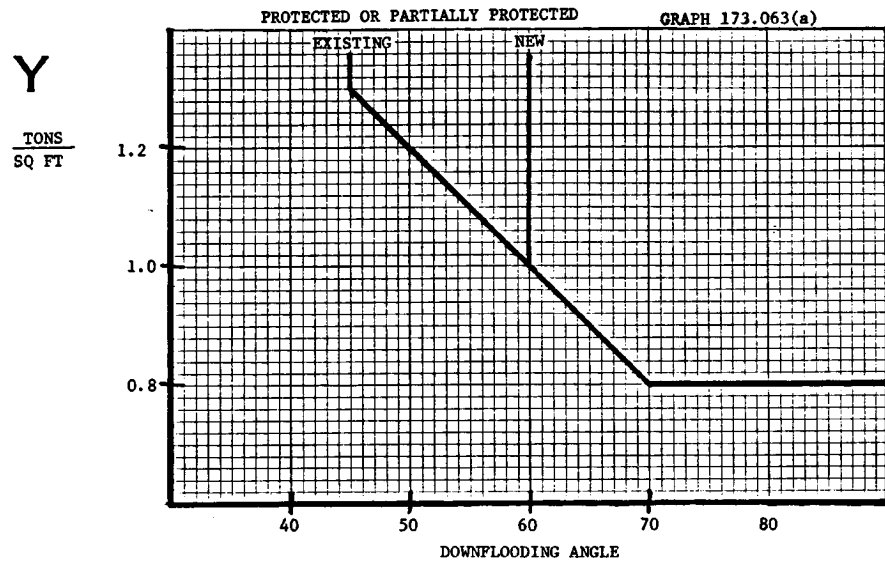
(4) To convert required numerals to units of "metric tons/square meter," multiply by 10.94.

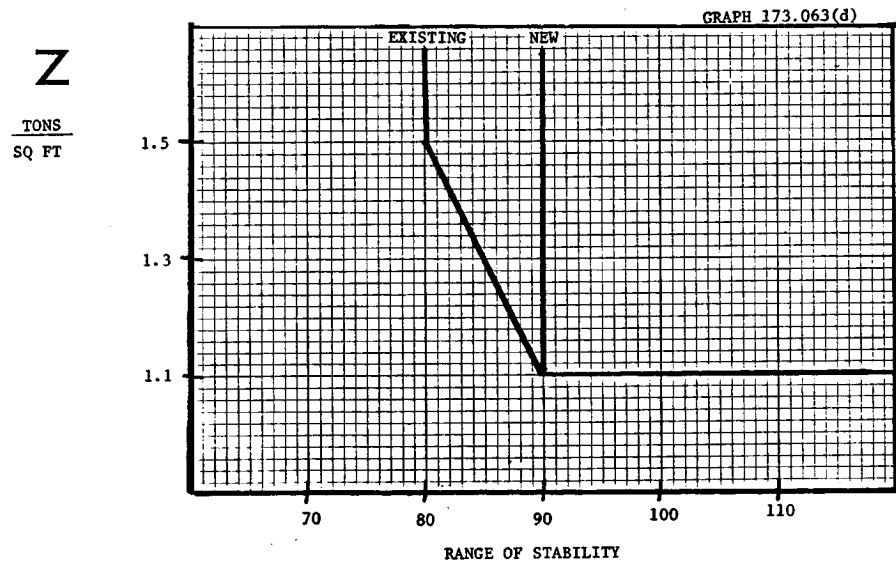
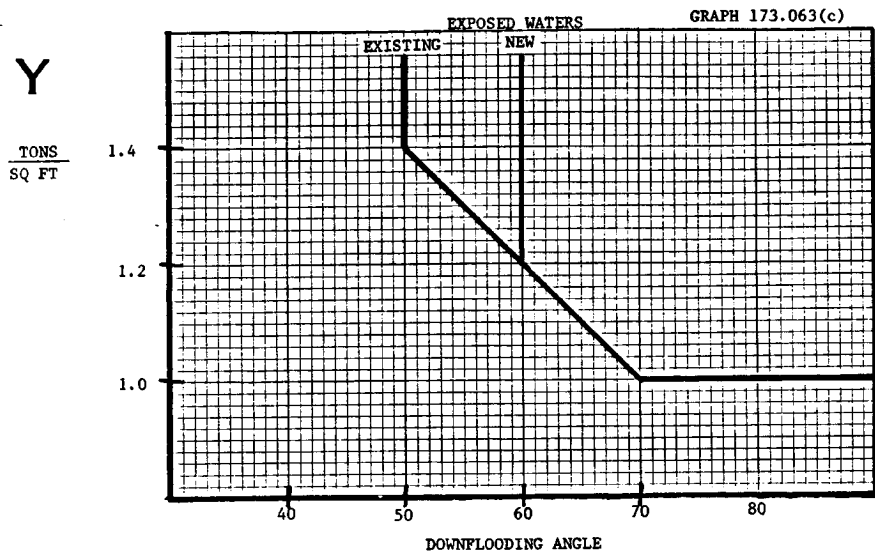
(d) Each vessel of the open boat type that is required to comply with the requirements in §§178.300 and 178.310 of

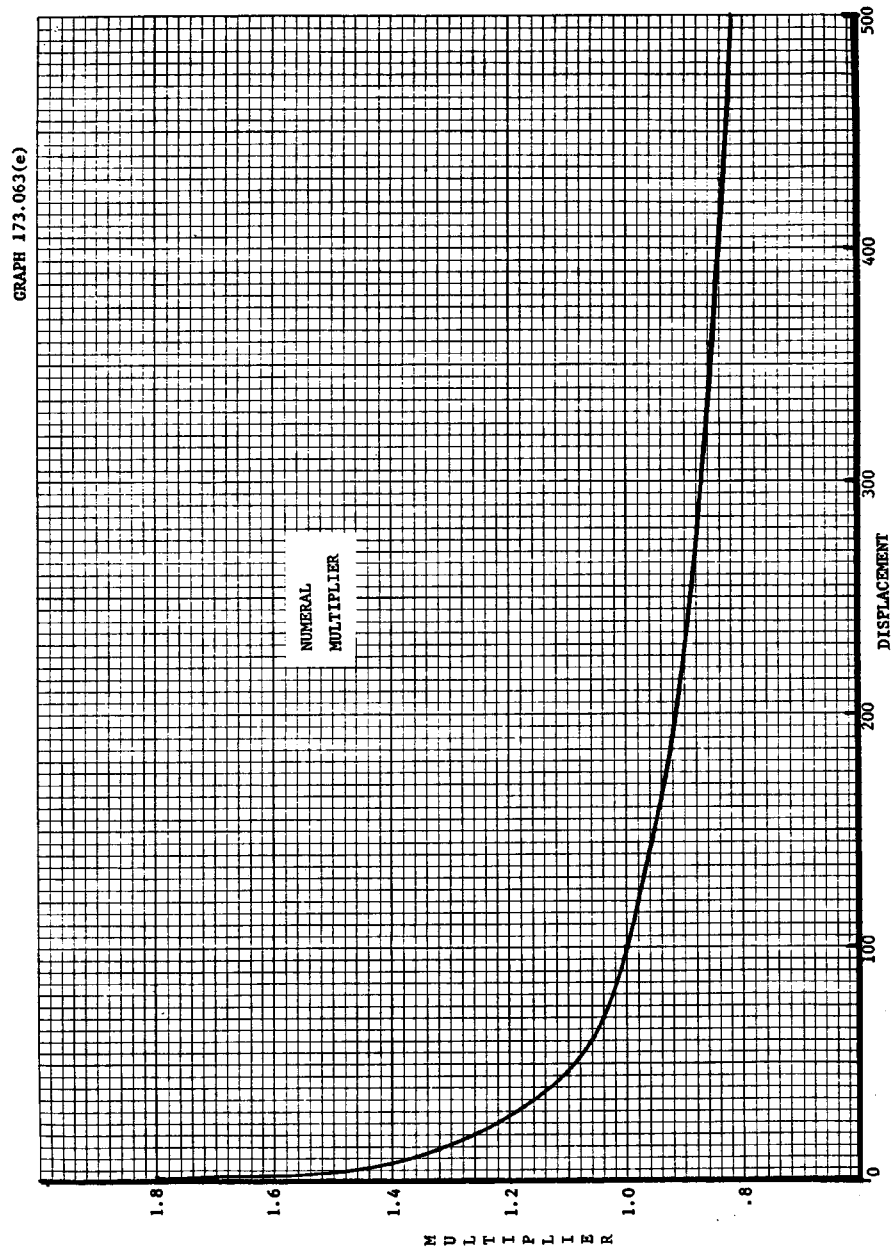
this chapter, may instead comply with the requirements in paragraph (e) of this section.

(e) In lieu of complying with the requirements of paragraph (b) of this section, an open boat may be provided with sufficient air tankage or other internal buoyancy to maintain the vessel afloat when the vessel is completely flooded or capsized. If foam is used to comply with this paragraph, it must be installed in accordance with the requirements in §170.245 of this subchapter.

(f) A sailing school catamaran must meet the intact stability requirements in §171.057.







[CGD 83-005, 51 FR 925, Jan. 9, 1986, as amended by CGD 85-080, 61 FR 946, Jan. 10, 1996]

Subpart D—Oceanographic Research

§ 173.070 Specific applicability.

Each oceanographic vessel, inspected under Subchapter U of this chapter, except a barge that is less than 300 gross tons, must comply with this subpart.

§ 173.075 Subdivision requirements.

(a) Each oceanographic vessel must comply with the subdivision requirements in §§ 171.070, 171.072, and 171.073 of this subchapter as if it were a passenger vessel carrying 400 or less passengers.

(b) Each vessel must have a collision bulkhead.

§ 173.080 Damage stability requirements.

Each oceanographic vessel must comply with § 171.080 of this subchapter as a category Z vessel.

§ 173.085 General subdivision requirements.

Each oceanographic vessel must comply with the following:

(a) Section 171.085(c)(1), (d) and (g) of this subchapter.

(b) Section 171.105 (a) through (g) of this subchapter except that a reduction or elimination of the required inner bottom is allowed if—

(1) The inner bottom would interfere with the mission of the vessel; and

(2) As a result of other design features, the ability of the vessel to withstand side and bottom damage is not reduced.

(c) Section 171.106 of this subchapter.

(d) Section 171.108 of this subchapter.

(e) Section 171.109 of this subchapter.

(f) Section 171.111 of this subchapter.

(g) Section 171.113 of this subchapter.

(h) The collision bulkhead must not be penetrated by more than one pipe that carries liquid to or from the forepeak tank. This pipe must have a screwdown valve that is—

(1) Operative from above the bulkhead deck; and

(2) Attached to the bulkhead inside the forepeak tank.

(i) Section 171.116 (b), (c), and (e) of this subchapter.

(j) Section 171.117(c) of this subchapter.

(k) Each port light in a space located below the freeboard deck, as defined in § 42.13–15(i) of this chapter, or in a space within an enclosed superstructure must be fitted with a hinged inside dead cover.

(l) Section 171.118 (b) and (c) of this subchapter.

(m) Section 171.122 (a) through (d) and (f) of this subchapter.

(n) Section 171.135 of this subchapter.

(o) A ventilation duct or forced draft duct may not penetrate a main transverse watertight bulkhead unless—

(1) The penetration is watertight;

(2) The penetration is located as near the vessel's centerline as possible; and

(3) The bottom of the duct is not more than—

(i) 18 inches (45.7 cm) below the bulkhead deck; and

(ii) 4 feet (121.9 cm) above the final waterline after damage determined in § 173.080.

Subpart E—Towing

§ 173.090 General.

This subpart applies to each vessel that is equipped for towing.

§ 173.095 Towline pull criterion.

(a) In each towing condition, each vessel must be shown by design calculations to meet the requirements of either paragraph (b) or (c) of this section.

(b) The vessel's metacentric height (GM) must be equal to or greater than the following:

$$GM = \frac{(N)(P \times D)^2_3(s)(h)}{K\Delta(f/B)}$$

where—

N=number of propellers.

P=shaft power per shaft in horsepower (kilowatts).

D=propeller diameter in feet (meters).

s=that fraction of the propeller circle cylinder which would be intercepted by the rudder if turned to 45 degrees from the vessel's centerline.

h=vertical distance from propeller shaft centerline at rudder to towing bitts in feet (meters).

Δ=displacement in long tons (metric tons).

f=minimum freeboard along the length of the vessel in feet (meters).

B=molded beam in feet (meters).

K=38 in English units.

K=13.93 in metric units.

(c) When a heeling arm curve, calculated in accordance with paragraph (d) of this section, is plotted against the vessel's righting arm curve—

(1) Equilibrium must be reached before the downflooding angle; and

(2) The residual righting energy must be at least 2 foot-degrees (.61 meter-degrees) up to the smallest of the following angles:

(i) The angle of maximum righting arm.

(ii) The downflooding angle.

(iii) 40 degrees.

(d) The heeling arm curve specified in paragraph (c) of this section must be calculated by the following equation:

$$HA = \frac{2(N)(P \times D)^2_3}{(s)(h)(\cos \theta)} K\Delta$$

where—

HA=heeling arm.

θ =angle of heel.

N, P, D, K, s, h, and Δ are as defined in paragraph (b) of this section.

(e) For the purpose of this section, downflooding angle means the static angle from the intersection of the vessel's centerline and waterline in calm water to the first opening that does not close watertight automatically.

(f) For the purpose of this section, at each angle of heel, a vessel's righting arm may be calculated considering either—

(1) The vessel is permitted to trim free until the trimming moment is zero; or

(2) The vessel does not trim as it heels.⁷

PART 174—SPECIAL RULES PERTAINING TO SPECIFIC VESSEL TYPES

Subpart A—General

Sec.

174.005 Applicability.

174.007 Incorporation by reference.

Subpart B—Special Rules Pertaining to Deck Cargo Barges

174.010 Specific applicability.

174.015 Intact stability.

174.020 Alternate intact stability criterion.

Subpart C—Special Rules Pertaining to Mobile Offshore Drilling Units

174.030 Specific applicability.

174.035 Definitions.

174.040 Stability requirements: general.

174.045 Intact stability requirements.

174.050 Stability on bottom.

174.055 Calculation of wind heeling moment (Hm).

174.065 Damage stability requirements.

174.070 General damage stability assumptions.

174.075 Compartments assumed flooded: general.

174.080 Flooding on self-elevating and surface type units.

174.085 Flooding on column stabilized units.

174.090 Permeability of spaces.

174.100 Appliances for watertight and weathertight integrity.

Subpart D [Reserved]

Subpart E—Special Rules Pertaining to Tugboats and Towboats

174.140 Specific applicability.

174.145 Intact stability requirements.

Subpart F [Reserved]

Subpart G—Special Rules Pertaining to Offshore Supply Vessels

174.180 Applicability.

174.185 Intact stability.

174.190 Collision bulkhead.

174.195 Bulkheads in machinery spaces.

174.200 Damaged stability in machinery spaces for all OSVs.

174.205 Additional damaged stability for OSVs carrying more than 16 offshore workers.

174.207 Damaged stability criteria.

174.210 Watertight doors in watertight bulkheads.

174.215 Drainage of weather deck.

174.220 Hatches and coamings.

174.225 Hull penetrations and shell connections.

Subpart H—Special Rules Pertaining to Liftboats

174.240 Applicability.

174.245 General.

174.250 Unrestricted service.

174.255 Restricted service.

174.260 Freeboard.

Subpart I—Hopper Dredges With Working Freeboard Assignments

174.300 Specific applicability.

174.305 Definitions.

Coast Guard, DOT

§ 174.015

CALCULATIONS

- 174.310 General.
- 174.315 Extent and character of damage.
- 174.320 Damage survival.
- 174.325 Equalization.
- 174.330 Jettisoning of spoil.

DESIGN

- 174.335 Watertight doors.
- 174.340 Collision bulkhead.

Subpart J—Special Rules Pertaining to Dry Cargo Ships

- 174.350 Specific applicability.
- 174.355 Definitions.
- 174.360 Calculations.

AUTHORITY: 42 U.S.C. 9118, 9119, 9153; 43 U.S.C. 1333; 46 U.S.C. 3306, 3703; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

SOURCE: CGD 79-023, 48 FR 51048, Nov. 4, 1983, unless otherwise noted.

Subpart A—General

§ 174.005 Applicability.

Each of the following vessels must comply with the applicable provisions of this part:

- (a) Deck cargo barge.
- (b) Mobile offshore drilling unit (MODU) inspected under subchapter IA of this chapter.
- (c) Tugboat and towboat inspected under subchapter I of this chapter.
- (d) Self-propelled hopper dredge having an assigned working freeboard.
- (e) Ocean-going ships of 500 gross tons or over, as calculated by the International Convention on Tonnage Measurement of Ships, 1969, designed primarily for the carriage of dry cargoes, including roll-on/roll-off ships.
- (f) Offshore supply vessel inspected under subchapter L of this chapter.
- (g) Liftboat inspected under subchapter L of this chapter.

[CGD 95-012, 60 FR 48052, Sept. 18, 1995; 60 FR 50120, Sept. 28, 1995, as amended by CGD 82-004 and CGD 86-074, 60 FR 57671, Nov. 16, 1995; CGD 82-004 and CGD 86-074, 62 FR 49353, Sept. 19, 1997]

§ 174.007 Incorporation by reference.

- (a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a). To enforce any edition other

than that specified in paragraph (b) of this section, the Coast Guard must publish notice of change in the FEDERAL REGISTER and make the material available to the public. All approved material is on file at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC, and at the U.S. Coast Guard, Office of Design and Engineering Standards (G-MSE), 2100 Second Street SW., Washington, DC 20593-0001 and is available from the sources indicated in paragraph (b) of this section.

- (b) The material approved for incorporation by reference in this part and the sections affected are:

American Society for Testing and Materials (ASTM)

- 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
- ASTM F-1196, Sliding Watertight Door Assemblies, 1989174.100
- ASTM F-1197, Sliding Watertight Door Control Systems, 1989174.100
- [CGD 88-032, 56 FR 35828, July 29, 1991, as amended by CGD 95-072, 60 FR 50468, Sept. 29, 1995; CGD 96-041, 61 FR 50734, Sept. 27, 1996; CGD 97-057, 62 FR 51049, Sept. 30, 1997]

Subpart B—Special Rules Pertaining to Deck Cargo Barges

§ 174.010 Specific applicability.

Each barge that carries cargo above the weather deck must comply with this subpart.

§ 174.015 Intact stability.

- (a) Except as provided in § 174.020, in each condition of loading and operation, each barge must be shown by design calculations to have an area under the righting arm curve up to the angle of maximum righting arm, the downflooding angle, or 40 degrees, whichever angle is smallest, equal to or greater than—

- (1) 15 foot-degrees (4.57 meter-degrees) for ocean and Great Lakes winter service; and
- (2) 10 foot-degrees (3.05 meter-degrees) for lakes, bays, sounds, and Great Lakes summer service.

- (b) For the purpose of this section, downflooding angle means the static angle from the intersection of the vessel's centerline and waterline in calm

§ 174.020

water to the first opening that does not close watertight automatically.

§ 174.020 Alternate intact stability criterion.

A barge need not comply with § 174.015 and subparts C and E of part 170 of this chapter if it has the following characteristics:

- (a) The weather deck is watertight.
- (b) The barge's hull proportions fall within any one of the ratios in categories (A) through (D) in Table 174.020.
- (c) The maximum cargo height is 30 feet (9.25 meters) or a value equal to the depth of the barge amidships, whichever is less.

TABLE 174.020

Category	Beam/depth ratio	Draft/depth ratio
A	3.00 to 3.74	Equal to or less than 0.70.
B	3.75 to 3.99	Equal to or less than 0.72.
C	4.00 to 4.49	Equal to or less than 0.76.
D	4.50 to 6.00	Equal to or less than 0.80.

Subpart C—Special Rules Pertaining to Mobile Offshore Drilling Units

§ 174.030 Specific applicability.

Each mobile offshore drilling unit (MODU) inspected under Subchapter IA of this chapter must comply with this subpart.

§ 174.035 Definitions.

(a) For the purpose of this subpart the following terms have the same definitions as given in Subchapter IA of this chapter:

- (1) *Column stabilized unit.*
- (2) *Mobile offshore drilling unit.*
- (3) *Self-elevating unit.*
- (4) *Surface type unit.*

(b) For the purpose of this subpart—

- (1) *Downflooding* means the entry of seawater through any opening that cannot be rapidly closed watertight, into the hull, superstructure, or columns of an undamaged unit due to heel, trim, or submergence of the unit.

(2) *Downflooding angle* means the static angle from the intersection of the unit's centerline and waterline in calm water to the first opening

46 CFR Ch. I (10–1–98 Edition)

through which downflooding can occur when subjected to a wind heeling moment (Hm) calculated in accordance with § 174.055.

(3) *Normal operating condition* means a condition of a unit when loaded or arranged for drilling, field transit, or ocean transit.

(4) *Severe storm condition* means a condition of a unit when loaded or arranged to withstand the passage of a severe storm.

§ 174.040 Stability requirements: general.

Each unit must be designed to have at least 2 inches (50mm) of positive metacentric height in the upright equilibrium position for the full range of drafts, whether at the operating draft for navigation, towing, or drilling afloat, or at a temporary draft when changing drafts.

§ 174.045 Intact stability requirements.

(a) Each unit must be designed so that the wind heeling moments (Hm) and righting moments calculated for each of its normal operating conditions and severe storm conditions, when plotted on GRAPH 174.045, define areas that satisfy the equation:

$$\text{Area (A)} \geq (K) \times (\text{Area (B)})$$

where—

- (1) $K=1.4$ except that if the unit is a column stabilized unit $K=1.3$;
- (2) Area (A) is the area on GRAPH 174.045 under the righting moment curve between 0 and the second intercept angle or the angle of heel at which downflooding would occur, whichever angle is less; and
- (3) Area (B) is the area on GRAPH 174.045 under the wind heeling moment curve between 0 and the second intercept angle or the angle of heel at which downflooding of the unit would occur whichever angle is less.

(b) Each righting moment on graph § 174.045 must be positive for all angles greater than 0 and less than the second intercept angle.

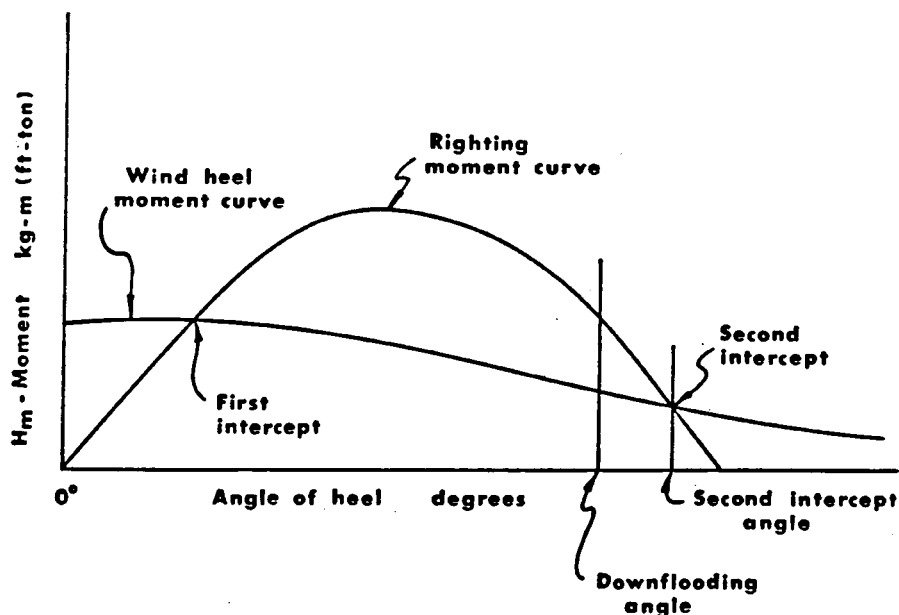
(c) For the purposes of this section, openings fitted with the weathertight closing appliances specified in § 174.100(b) are not considered as openings through which downflooding could occur if they can be rapidly closed and would not be submerged below the

units' waterline prior to the first intercept angle, except that ventilation intakes and outlets for machinery spaces, crew spaces, and other spaces where ventilation is normally required are considered as openings through which downflooding could occur regardless of location.

(d) Each unit must be designed so that it can be changed from each of its normal operating conditions to a severe storm condition within a minimum period of time consistent with the operating manual required in § 109.121 of this chapter.

GRAPH 174.045

Intact Stability Curves for a Given Normal
Operating or Severe Storm Mode



[CGD 79-023, 48 FR 51048, Nov. 4, 1983, as amended by CGD 83-071, 52 FR 6979, Mar. 6, 1987]

§ 174.050 Stability on bottom.

Each bottom bearing unit must be designed so that, while supported on the sea bottom with footings or a mat, it continually exerts a downward force on each footing or the mat when sub-

jected to the forces of wave and current and to wind blowing at the velocities described in § 174.055(b)(3).

§ 174.055 Calculation of wind heeling moment (Hm).

(a) The wind heeling moment (Hm) of a unit in a given normal operating condition or severe storm condition is the

§ 174.065

sum of the individual wind heeling moments (H) calculated for each of the exposed surfaces on the unit; i.e., $H_m = \sum H$.

(b) Each wind heeling moment (H) must be calculated using the equation:

$$H = k(v)^2(Ch)(Cs)(A)(h)$$

where—

- (1) H=wind heeling moment for an exposed surface on the unit in foot-pounds (kilogram-meters);
- (2) $k=0.00338 \text{ lb.}/(\text{ft.}^2\text{-knots}^2)$ ($0.0623 \text{ (kg-sec}^2\text{)}/\text{m}^4$);
- (3) v=wind velocity of—
 - (i) 70 knots (36 meters per second) for normal operating conditions.
 - (ii) 100 knots (51.5 meters per second) for severe storm conditions.
 - (iii) 50 knots (25.8 meters per second) for damage conditions.
- (4) A=projected area in square feet (square meters) of an exposed surface on the unit;
- (5) Ch=height coefficient for "A" from Table 174.055(a);
- (6) Cs=shape coefficient for "A" from Table 174.055(b); and
- (7) h=the vertical distance in feet (meters) from the center of lateral resistance of the underwater hull to the center of wind pressure on "A".

(c) When calculating "A" in the equation described in paragraph (b) of this section—

- (1) The projected area of each column or leg; if the unit has columns or legs, must not include shielding allowances;
- (2) Each area exposed as a result of heel must be included;
- (3) The projected area of a cluster of deck houses may be used instead of the projected area of each individual deck house in the cluster; and
- (4) The projected area of open truss work may be calculated by taking 30% of the projected areas of both the front and back sides of the open truss work rather than by determining the projected area of each structural member of the truss work.

TABLE 174.055(A)—CH VALUES

Feet		Meters		Ch.
Over	Not exceeding	Over	Not exceeding	
0	50	0.0	15.3	1.00
50	100	15.3	30.5	1.10
100	150	30.5	46.0	1.20
150	200	46.0	61.0	1.30
200	250	61.0	76.0	1.37
250	300	76.0	91.5	1.43

46 CFR Ch. I (10–1–98 Edition)

TABLE 174.055(A)—CH VALUES—Continued

Feet		Meters		Ch.
Over	Not exceeding	Over	Not exceeding	
300	350	91.5	106.5	1.48
350	400	106.5	2.0	1.52
400	450	122.0	137.0	1.56
450	500	137.0	152.5	1.60
500	550	152.5	167.5	1.63
550	600	167.5	183.0	1.67
600	650	183.0	198.0	1.70
650	700	198.0	213.5	1.72
700	750	213.5	228.5	1.75
750	800	228.5	244.0	1.77
800	850	244.0	256.0	1.79
Above 850		Above 256		1.80

NOTE: The "Ch" value in this table, used in the equation described in section § 174.055(b), corresponds to the value of the vertical distance in feet (meters) from the water surface at the design draft of the unit to the center of area of the "A" value used in the equation.

TABLE 174.055(B)—CS VALUES

Shape	Cs.
Cylindrical shapes	0.5
Hull (surface type)	1.0
Deckhouse	1.0
Cluster of deckhouses	1.1
Isolated structural shapes (cranes, angles, channels, beams, etc.)	1.5
Under deck areas (smooth surfaces)	1.0
Under deck areas (exposed beams and girders)	1.3
Rig derrick (each face and open truss works)	1.25

NOTE: The "Cs" value in this table, used in the equation described in § 174.055(b), corresponds to the shape of the projected "A" in the equation.

§ 174.065 Damage stability requirements.

(a) Each unit must be designed so that, while in each of its normal operating conditions and severe storm conditions, its final equilibrium waterline would remain below the lowest edge of any opening through which additional flooding could occur if the unit were subjected simultaneously to—

- (1) Damage causing flooding described in §§ 174.075 through 174.085; and
- (2) A wind heeling moment calculated in accordance with § 174.055(b) using a wind velocity of 50 knots (25.8 meters per second).

(b) Each unit must have a means to close off each pipe, ventilation system, and trunk in each compartment described in § 174.080 or § 174.085 if any portion of the pipe, ventilation system, or trunk is within 5 feet (1.5 meters) of the hull.

174.070 General damage stability assumptions.

For the purpose of determining compliance with § 174.065, the assumptions are made that during flooding and the resulting change in the unit's waterline—

(a) The unit is not anchored or moored; and

(b) No compartment on the unit is ballasted or pumped out to compensate for the flooding described in §§ 174.075 through 174.085.

§ 174.075 Compartments assumed flooded: general.

The individual flooding of each of the compartments described in §§ 174.080 and 174.085 must be assumed for the purpose of determining compliance with § 174.065 (a). Simultaneous flooding of more than one compartment must be assumed only when indicated in §§ 174.080 and 174.085.

§ 174.080 Flooding on self-elevating and surface type units.

(a) On a surface type unit or self-elevating unit, all compartments within 5 feet (1.5 meters) of the hull of the unit between two adjacent main watertight bulkheads, the bottom shell, and the uppermost continuous deck or first superstructure deck where superstructures are fitted must be assumed to be subject to simultaneous flooding.

(b) On the mat of a self-elevating unit, all compartments of the mat must be assumed to be subject to individual flooding.

§ 174.085 Flooding on column stabilized units.

(a) Watertight compartments that are outboard of, or traversed by, a plane which connects the vertical centerlines of the columns on the periphery of the unit, and within 5 feet (1.5 meters) of an outer surface of a column or footing on the periphery of the unit, must be assumed to be subject to flooding as follows:

(1) When a column is subdivided into watertight compartments by horizontal watertight flats, all compartments in the column within 5 feet (1.5 meters) of the unit's waterline before damage causing flooding must be as-

sumed to be subject to simultaneous flooding.

(2) When a column is subdivided into watertight compartments by vertical watertight bulkheads, each two adjacent compartments must be assumed subject to simultaneous flooding if the distance between the vertical watertight bulkheads, measured at the column periphery, is equal to or less than one-eighth of the column perimeter at the draft under consideration.

(3) When a column is subdivided into watertight compartments by horizontal watertight flats and vertical watertight bulkheads, those compartments that are within the bounds described in paragraph (a)(2) of this section and within 5 feet (1.5 meters) of the unit's waterline before damage causing flooding must be assumed to be subject to simultaneous flooding.

(b) Each compartment in a footing must be assumed to be subject to individual flooding when any part of the compartment is within 5 feet (1.5 meters) of the unit's waterline before damage causing flooding.

§ 174.090 Permeability of spaces.

When doing the calculations required in § 174.065—

(a) The permeability of a floodable space, other than a machinery space, must be as listed in Table 174.090; and

(b) Calculations in which a machinery space is treated as a floodable space must be based on an assumed machinery space permeability of 85%, unless the use of an assumed permeability of less than 85% is justified in detail.

TABLE 174.090—PERMEABILITY

Spaces and tanks	Permeability (percent)
Storeroom spaces	60.
Accommodation spaces	95.
Voids	95.
Consumable liquid tanks	95 or 0. ¹
Other liquid tanks	95 or 0. ²

¹ Whichever results in the more disabling condition.

² If tanks are partially filled, the permeability must be determined from the actual density and amount of liquid carried.

§ 174.100 Appliances for watertight and weathertight integrity.

(a) Appliances to insure watertight integrity include watertight doors, hatches, scuttles, bolted manhole covers, or other watertight closures for

openings in watertight decks and bulkheads.

(b) Appliances to insure weathertight integrity include weathertight doors and hatches, closures for air pipes, ventilators, ventilation intakes and outlets, and closures for other openings in deckhouses and superstructures.

(c) Each internal opening equipped with appliances to insure watertight integrity that is used intermittently during operation of the unit while afloat must meet the following:

(1) Each door, hatch, and scuttle must—

(i) Be remotely controlled from a normally manned control station, and be operable locally from both sides of the bulkhead; or

(ii) If there is no means of remote control there must be an alarm system that signals whether the appliance is open or closed both locally at each appliance and in a normally manned control station.

(2) Each closing appliance must remain watertight under the design water pressure of the watertight boundary of which it is a part.

(d) Each external opening fitted with an appliance to insure weathertight integrity must be located so that it would not be submerged below the final equilibrium waterline if the unit is subjected simultaneously to—

(1) Damage causing flooding described in §§ 174.075 through 174.085; and

(2) A wind heeling moment calculated in accordance with § 174.055 using a wind velocity of 50 knots (25.8 meters per second).

(e) If a unit is equipped with sliding watertight doors, each sliding watertight door must—

(1) Be designed, constructed, tested, and marked in accordance with ASTM F-1196;

(2) Have controls in accordance with ASTM F-1197, except that a remote manual means of closure, as specified in paragraphs 7.1 and 7.5.1, and a remote mechanical indicator, as specified in paragraph 7.5.2, will not be required; and

(3) If installed in a subdivision bulkhead, meet Supplemental Requirements Nos. S1 and S3 of ASTM F-1196,

unless the watertight doors are built in accordance with plans previously approved by the Coast Guard, in which case, only Supplemental Requirements Nos. S1 and S3.1.4 of ASTM F-1196 must be met. In either case, control systems for watertight doors must have power supplies, power sources, installation tests and inspection, and additional remote operating consoles in accordance with Supplemental Requirements Nos. S1 through S4 of ASTM F-1197.

(f) Installations of sliding watertight door assemblies must be in accordance with the following:

(1) Before a sliding watertight door assembly is installed in a vessel, the bulkhead in the vicinity of the door opening must be stiffened. Such bulkhead stiffeners, or deck reinforcement where flush deck door openings are desired, must not be less than 6 inches nor more than 12 inches from the door frame so that an unstiffened diaphragm of bulkhead plating 6 to 12 inches wide is provided completely around the door frame. Where such limits cannot be maintained, alternative installations will be considered by the Marine Safety Center. In determining the scantlings of these bulkhead stiffeners, the door frame should not be considered as contributing to the strength of the bulkhead. Provision must also be made to adequately support the thrust bearings and other equipment that may be mounted on the bulkhead or deck.

(2) Sliding watertight door frames must be either bolted or welded watertight to the bulkhead.

(i) If bolted, a suitable thin heat and fire resistant gasket or suitable compound must be used between the bulkhead and the frame for watertightness. The bulkhead plating shall be worked to a plane surface in way of the frame when mounting.

(ii) If welded, caution must be exercised in the welding process so that the door frame is not distorted.

[CGD 79-023, 48 FR 51048, Nov. 4, 1983, as amended by CGD 88-032, 56 FR 35828, July 29, 1991]

Subpart D [Reserved]**Subpart E—Special Rules Pertaining to Tugboats and Towboats****§ 174.140 Specific applicability.**

Each tugboat and towboat inspected under subchapter I of this chapter must comply with this subpart.

§ 174.145 Intact stability requirements.

(a) In each condition of loading and operation, each vessel must be shown by design calculations to meet the requirements of paragraphs (b) through (e) of this section.

(b) The area under each righting arm curve must be at least 16.9 foot-degrees (5.15 meter-degrees) up to the smallest of the following angles:

(1) The angle of maximum righting arm.

(2) The downflooding angle.

(3) 40 degrees.

(c) The area under each righting arm curve must be at least 5.6 foot-degrees (1.72 meter-degrees) between the angles of 30 degrees and 40 degrees, or between 30 degrees and the downflooding angle if this angle is less than 40 degrees.

(d) The maximum righting arm shall occur at a heel of at least 25 degrees.

(e) The righting arm curve must be positive to at least 60 degrees.

(f) For the purpose of this section, at each angle of heel, a vessel's righting arm may be calculated considering either—

(1) The vessel is permitted to trim free until the trimming moment is zero; or

(2) The vessel does not trim as it heels.

Subpart F [Reserved]**Subpart G—Special Rules Pertaining to Offshore Supply Vessels**

SOURCE: CGD 82-004 and CGD 86-074, 62 FR 49353, Sept. 19, 1997, unless otherwise noted.

§ 174.180 Applicability.

Each offshore supply vessel (OSV), except a liftboat inspected under subchapter L of this chapter, must comply with this subpart.

§ 174.185 Intact stability.

(a) Each OSV must be shown by design calculations to meet, under each condition of loading and operation, the minimal requirements for metacentric height (GM) in § 170.170 of this chapter, and in either § 170.173 of this chapter or paragraphs (b) through (e) of this section.

(b) The area under each righting arm curve must be at least 0.08 meter-radians (15 foot-degrees) up to the smallest of the following angles:

(1) The angle of maximum righting arm;

(2) The downflooding angle; or

(3) 40 degrees.

(c) The downflooding angle must not be less than 20 degrees.

(d) The righting arm curve must be positive to at least 40 degrees.

(e) The freeboard at the stern must be equal to the freeboard calculated to comply with subchapter E of this chapter or to the value taken from Table 174.185, whichever is less.

(f) For paragraphs (b) and (d) of this section, at each angle of heel an OSV's righting arm may be calculated considering either—

(1) The vessel is permitted to trim free until the trimming moment is zero; or

(2) The vessel does not trim as it heels.

(g) For the purpose of paragraphs (b) and (d) of this section, the method of calculating righting arms chosen must be the same for all calculations.

TABLE 174.185.—MINIMAL FREEBOARD AT THE STERN

LBP in meters (feet)	Freeboard at stern in millimeters (inches)
Less than 20 (65)	300 (12)
20 (65) but less than 30 (100)	380 (15)
30 (100) but less than 40 (130)	400 (18)
40 (130) but less than 50 (155)	500 (20)
50 (155) but less than 60 (190)	560 (22)
60 (190) but less than 70 (230)	610 (24)
70 (230) and greater	660 (26)

§ 174.190 Collision bulkhead.

(a) Each OSV must have a collision bulkhead in compliance with §§ 171.085(c)(1), (d), (e)(2), and (f) of this chapter.

(b) Penetration of the collision bulkhead by piping must be minimal, and, where fitted, piping must meet the requirements of §§ 56.50–1(b)(1) and (c) and 128.230 of this chapter.

§ 174.195 Bulkheads in machinery spaces.

(a) The bulkhead in each machinery space of each OSV must be watertight to the bulkhead deck.

(b) Each penetration of, and each opening in, a bulkhead in a machinery space must—

(1) Be kept as high and as far inboard as practicable; and

(2) Except as provided by § 174.210 of this subpart and by paragraph (c) of this section, have means to make it watertight.

(c) No penetration of a bulkhead in a machinery space by a ventilation duct need have means to make the bulkhead watertight if—

(1) Every part of the duct is at least 760 millimeter (30 inches) from the side of the OSV; and

(2) The duct is continuously watertight from the penetration to the main deck.

(d) Each penetration of a bulkhead in a machinery space by piping must meet the design requirements for material and pressure in subchapter F of this chapter.

§ 174.200 Damaged stability in machinery spaces for all OSVs.

Each OSV must be shown by design calculations to comply, under each afloat condition of loading and operation, with § 174.207 of this subpart in case of damage between any two watertight bulkheads in each machinery space.

§ 174.205 Additional damaged stability for OSVs carrying more than 16 offshore workers.

(a) *Calculations.* Each OSV carrying more than 16 offshore workers must be shown by design calculations to comply, under each afloat condition of loading and operation, with § 174.207 of this subpart in case of the damage specified by paragraph (b) of this section.

(b) *Character of damage.* For paragraph (a) of this section, design cal-

culations must show that the OSV can survive damage at any place other than either the collision bulkhead or a transverse watertight bulkhead unless—

(1) The transverse watertight bulkhead is closer than the longitudinal extent of damage, specified by Table 174.207(a), to the adjacent transverse watertight bulkhead; or

(2) The transverse watertight bulkhead has a step or a recess, which must be assumed damaged, if it is both more than 3 meters (10 feet) in length and located within the transverse extent of damage specified by Table 174.207(a) of this section.

§ 174.207 Damaged stability criteria.

(a) *Extent of damage.* Damage must consist of penetrations having the dimensions specified by table 174.207(a) of this section, except that, if the most disabling penetrations are smaller than the penetrations specified by the table, damage must consist of the smaller penetrations.

(b) *Permeability of spaces.* The permeability of a floodable space must be as specified by Table 174.207(b) of this section.

(c) *Survival conditions.* An OSV is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(1) *Final waterline.* The final waterline, in the final stage of sinkage, heel, and trim, must be below the lower edge of an opening through which progressive flooding may take place, such as an air pipe, a tonnage opening, an opening closed by a weathertight door or hatch-cover, or a tank vent fitted with a ball check-valve. This opening does not include an opening closed by a—

- (i) Watertight manhole-cover;
- (ii) Flush scuttle;
- (iii) Small hatch-cover for a watertight cargo-tank that maintains the high integrity of the deck;
- (iv) Watertight door in compliance with § 174.210 of this subpart; or
- (v) Side scuttle of the non-opening type.

(2) *Angle of heel.* The angle of heel must not exceed 15 degrees.

(3) *Range of stability.* Through an angle of 20 degrees beyond its position

of equilibrium after flooding, an OSV must meet the following conditions:

(i) The righting arm curve must be positive.

(ii) The righting arm must be at least 100 millimeters (4 inches).

(iii) Each submerged opening must be weathertight. (A tank vent fitted with a ball check-valve is weathertight.)

(4) *Progressive flooding.* Piping, ducts, or tunnels within the assumed extent of damage must be either—

(i) Equipped with arrangements, such as stop check-valves, to prevent progressive flooding of the spaces with which they connect; or

(ii) Assumed in the calculations required by paragraph (a) of this section to permit progressive flooding of the spaces with which they connect.

(d) *Buoyancy of superstructure.* For paragraph (a) of this section, the buoyancy of any superstructure directly above the side damage must be considered in the most unfavorable condition.

TABLE 174.207(A)—EXTENT OF DAMAGE

Collision Penetration	
Longitudinal extent (vessels with LBP not greater than 45 meters [143 feet]).	.1L or 1.8 meters (6 feet);, whichever is greater in length.
Longitudinal extent (vessels with LBP greater than 45 meters [143 feet]).	3 meters (10 feet) + .03L.
Transverse extent*	760 millimeters (30 inches).
Vertical extent.	From baseline upward without limit.

*The transverse penetration applies inboard from the side of the vessel, at right angles to the centerline, at the level of the deepest load waterline.

TABLE 174.207(B).—PERMEABILITY OF SPACES

Spaces and tanks	Permeability
Storerooms	60 percent.
Accommodations	95 percent.
Machinery	85 percent.
Voids and passageways	95 percent.
Dry-bulk tanks	0 (*) or 95 percent.
Consumable-liquid tanks	0 (*) or 95 percent.
Other liquid tanks	0 (*) 0 (**) or 95 percent.

*Whichever results in the more disabling condition.
 **If tanks are partly filled, the permeability must be determined from the actual density and amount of liquid carried.

§ 174.210 Watertight doors in watertight bulkheads.

(a) This section applies to each vessel with watertight doors in bulkheads

made watertight in compliance with this chapter.

(b) Except as provided by paragraph (c) of this section, each watertight door must comply with subpart H of part 170 of this chapter.

(c) A Class-1 door may be installed at any place if—

(1) The door has a quick-acting closing-device operative from both sides of the door;

(2) The door is designed to withstand a head of water equivalent to the depth from the sill of the door to the bulkhead deck or 3 meters (10 feet), whichever is greater; and

(3) The vessel's pilothouse contains a visual indicator showing whether the door is open or closed.

(d) Each watertight door must be marked in compliance with § 131.893 of this chapter.

(e) If a Class-1 door is installed, the vessel's stability letter will require the master to ensure that the door is always closed except when being used for access.

§ 174.215 Drainage of weather deck.

The weather deck must have open rails to allow rapid clearing of water, or must have freeing ports in compliance with § 42.15-70 of this chapter.

§ 174.220 Hatches and coamings.

(a) Each hatch exposed to the weather must be watertight, except that the following hatches may be only weathertight:

(1) Each hatch on a watertight trunk that extends at least 430 millimeters (17 inches) above the weather deck.

(2) Each hatch in a cabin top.

(b) Each hatch cover must—

(1) Have securing-devices; and

(2) Be attached to the hatch frame or coaming by hinges, captive chains, or other devices to prevent its loss.

(c) Each hatch that provides access to quarters or to accommodation spaces for crew members or offshore workers must be capable of being opened and closed from either side.

(d) Except as provided by paragraph (e) of this section, a weathertight door with a permanent watertight coaming at least 380 millimeters (15 inches) high must be installed for each opening in a deckhouse or companionway that—

- (1) Gives access into the hull; and
- (2) Is in an exposed place.

(e) If an opening in a deckhouse or companionway has a Class-1 watertight door installed, the height of the watertight coaming need only accommodate the door.

§ 174.225 Hull penetrations and shell connections.

Each overboard discharge and shell connection except an engine exhaust must comply with §§ 56.50–95 and 128.230 of this chapter.

**Subpart H—Special Rules
Pertaining to Liftboats**

SOURCE: CGD 82–004 and CGD 86–074, 62 FR 49355, Sept. 19, 1997, unless otherwise noted.

§ 174.240 Applicability.

Each liftboat inspected under subchapter L of this chapter must comply with this subpart.

§ 174.245 General.

Each liftboat must comply with §§ 174.210 through 174.225.

§ 174.250 Unrestricted service.

Each liftboat not limited to restricted service must comply with subpart C of this part in each condition of loading and operation.

§ 174.255 Restricted service.

This section applies to each liftboat unable to comply with § 174.250 and limited to restricted service as defined by § 125.160 of this chapter.

(a) *Intact stability.* (1) Each liftboat must be shown by design calculations to meet, under each condition of loading and operation afloat, the following requirements:

(i) Those imposed by § 174.045, given a “K” value of at least 1.4.

(ii) A range of positive stability of at least 10 degrees extending from the angle of the first intercept of the curves of righting moment and wind heeling moment, either to the angle of the second intercept of those curves or to the angle of heel at which downflooding would occur, whichever angle is less.

(iii) A residual righting energy of at least 0.003 meter radians (5 foot-degrees) between the angle of the first intercept of the curves of righting moment and wind heeling moment, either to the angle of the second intercept of those curves or to the angle of heel at which downflooding would occur, whichever angle is less.

(2) For this section, each wind heeling moment must be calculated as prescribed by § 174.055 of this part using winds of 60 knots for normal conditions of operation afloat and of 70 knots for severe-storm conditions of operation afloat.

(3) For paragraph (a)(1) of this section, the initial metacentric height must be at least 300 millimeters (1 foot) for each leg position encountered while afloat including the full range of leg positions encountered while jacking.

(b) *Damaged stability.* (1) Each liftboat must be designed so that, while it is in each of its normal operating conditions, its final equilibrium waterline will remain below the lowest edge of any opening through which additional flooding can occur if the liftboat is subjected simultaneously to—

(i) Damage causing flooding described by paragraph (b)(4) of this section; and

(ii) A wind heeling moment calculated in compliance with § 174.055(b) using a wind speed of 50 knots.

(2) Each liftboat must have a means of closing off each pipe, ventilation system, and trunk in each compartment described by paragraph (b)(4) of this section if any part of the pipe, ventilation system, or trunk is within 760 millimeters (30 inches) of the hull.

(3) For compliance with paragraph (b)(1) of this section, no compartment on the liftboat may be ballasted or pumped out to compensate for the flooding described by paragraph (b)(4) of this section.

(4) For compliance with paragraph (b)(1) of this section, each compartment within 760 millimeters (30 inches) of the hull, excluding the bottom of the liftboat, between two adjacent main watertight bulkheads and the uppermost continuous deck or first superstructure deck where superstructures are fitted must be assumed subject to simultaneous flooding.

(5) In the calculations required by paragraph (b)(1) of this section, the permeability of a floodable space must be as listed by Table 174.205(d).

(c) *On-bottom stability.* Each liftboat must be shown by design calculations to exert a continuous downward force on each footing when the vessel is supported on the bottom with footings and is subjected to the forces of waves, currents, and winds of 70 knots under normal conditions of operation, and winds of 100 knots under severe-storm conditions of operation when elevated in a safe place, if this place is other than a harbor of safe refuge. The waves and currents must be appropriate for the winds and place.

§ 174.260 Freeboard.

(a) Each liftboat not required to obtain and maintain a loadline in compliance with subchapter E of this chapter must place markings on each side of the vessel amidships. These markings must each consist of a horizontal line 460 millimeters (18 inches) in length and 25 millimeters (1 inch) in height. The upper edges of the markings must be at a distance equal to the authorized freeboard measured vertically below the intersection of the continuation outwards of the upper surface of the weather deck and the outer surface of the shell. This distance must be at least 610 millimeters (24 inches).

(b) The markings required by paragraph (a) of this section may not be submerged in any condition of loading or operation.

Subpart I—Hopper Dredges With Working Freeboard Assignments

SOURCE: CGD 76-080, 54 FR 36977, Sept. 6, 1989, unless otherwise noted.

§ 174.300 Specific applicability.

This subpart applies to each self-propelled hopper dredge for which a working freeboard assignment is being sought under part 44, subpart C, of this chapter.

§ 174.305 Definitions.

Hopper dredge has the same meaning as contained in § 44.310 of this chapter.

Length has the same meaning as contained in § 42.13-15(a) of this chapter.

Working freeboard has the same meaning as contained in § 44.310 of this chapter.

CALCULATIONS

§ 174.310 General.

(a) Each hopper dredge under this subpart must be shown by design calculations based on the assumptions under paragraphs (b), (c), (d), and (e) of this section, that it meets—

(1) The requirements in §§ 170.170, 170.173, and 170.300 of this chapter in each condition of loading and operation; and

(2) The survival conditions of § 174.320 in each condition of loading and operation assuming the character and extent of damage specified in § 174.315.

(b) The calculations required by paragraph (a) of this section must assume:

(1) The hoppers are full of seawater;

(2) The permeability of flooded spaces is as provided by Table 174.310;

(3) The equalization provisions of § 174.325; and

(4) The jettisoning provisions of § 174.330.

(c) The calculations required by this section must take into account a sufficient number of loading conditions to identify the condition in which the vessel is least stable, including, but not limited to, the most severe loading condition, and the:

(1) Specific gravity of the dredge spoil, from 1.02 up to and including the maximum required by paragraph (e)(1) of this section; and

(2) Draft, up to and including the draft corresponding to the working freeboard for the full range of trim.

(d) The calculations required by this section for a dredge with open hoppers may include spillage of spoil from the hopper resulting from changing the angle of heel and trim.

(e) The following assumptions must be made when doing the calculations required by this section:

(1) Dredged spoil in the hopper is a homogeneous liquid with a maximum specific gravity for the areas of operation.

(2) When calculating the vessel's righting arm, it is assumed at each

§ 174.315

46 CFR Ch. I (10–1–98 Edition)

angle of heel that the vessel trims free and the trimming moment is zero.

TABLE 174.310—PERMEABILITY OF FLOODABLE SPACES

Spaces and tanks	Permeability
Storerooms	0.60
Accommodation spaces	0.95
Consumable liquid tanks	0.00 or 0.95—whichever results in the more disabling condition.
Machinery space	0.85—unless otherwise supported by calculations.
Cargo tanks	Determined from the actual density and amount of liquid carried in the tank.

§ 174.315 Extent and character of damage.

(a) The calculations required by § 174.310 must show that the dredge can survive damage at any location along the length of the vessel including at a transverse bulkhead in accordance with paragraph (b) of this section.

(b) The calculations required by paragraph (a) of this section must assume the most disabling side penetration with the damage collision penetration provided by Table 174.315, except that if the most disabling damage collision penetrations would be less than those provided by Table 174.315, the smaller damage collision penetration must be assumed.

TABLE 174.315—EXTENT OF DAMAGE COLLISION PENETRATION

Longitudinal extent	$0.495L^{2/3}$ or 47.6 feet. $[(1/3)(L)^{2/3}$ or 14.5 meters] whichever is less.
Transverse extent ¹	$B/5$ or 37.7 feet. (11.5 meters), whichever is less.
Vertical extent	From the base line upward without limit.

¹ Damage applied inboard from the vessel's side at a right angle to the centerline at the draft corresponding to the working freeboard assigned under subchapter E of this chapter.

§ 174.320 Damage survival.

A hopper dredge survives assumed damage if it meets the following conditions:

(a) The maximum angle of heel in each stage of flooding must not exceed 30 degrees or the angle of downflooding whichever is less.

(b) The final waterline, taking into account sinkage, heel, and trim, must

be below the lowest edge of each opening through which progressive flooding may take place.

(c) The righting arm curve calculated after damage must:

(1) Have a minimum positive range of 20 degrees beyond the angle of equilibrium; and

(2) Reach a height of at least 4 inches (100mm) within the 20 degree positive range.

(d) Each opening within, or partially within, the 20 degree range beyond the angle of equilibrium must be weather-tight.

(e) After flooding or equalization as allowed by § 174.325, the hopper dredge's metacentric height must be at least 2 inches (50mm) when the dredge is in an upright position.

§ 174.325 Equalization.

When doing the calculations required by § 174.310 of this subpart—

(a) Equalization arrangements requiring mechanical aids, such as valves, may not be assumed to be effective in reducing the angle of heel; and

(b) Spaces joined by ducts may be assumed to be common spaces only if equalization takes place within 15 minutes after flooding begins.

§ 174.330 Jettisoning of spoil.

(a) When doing the calculations required by § 174.310 for a hopper dredge with bottom doors, it may be assumed that the spoil is jettisoned immediately after damage and that the bottom doors remain open if:

(1) The bottom doors are designed so that they may be fully opened from:

(i) The closed position within two minutes even if the main power source is lost or the bottom door actuating mechanism is damaged; and

(ii) The navigating bridge;

(2) The discharge area through the bottom doors is equal to or greater than 30 percent of the maximum cross sectional area of the hopper measured in a plane parallel to the waterline; and

(3) Asymmetrical jettisoning of the spoil is impossible.

(b) When doing the calculations required by § 174.310 for a hopper dredge with a split hull, it may be assumed

that the spoil is jettisoned immediately after damage if—

- (1) The hull is designed so that—
 - (i) The complete separation is effected within two minutes even if the main power source is lost or the actuating means is damaged; and
 - (ii) The actuating means can be operated from the navigating bridge;
- (2) It is shown to the Commanding Officer, Marine Safety Center, either by calculations or by operational tests, that the hulls can separate sufficiently to allow the dredged material to dump without bridging; and
- (3) Asymmetrical jettisoning of the spoil is impossible.

DESIGN

§ 174.335 Watertight doors.

(a) Each hopper dredge must have sliding watertight doors (Class 3) approved under § 170.270 of this chapter if the sill for the door is—

- (1) Installed below the bulkhead deck; and
 - (2) Less than 24 inches above the final waterline as shown by the calculations required by § 174.310 in each damage condition up to and including the maximum amount of assumed damage.
- (b) Each hopper dredge must have sliding watertight doors (Class 3) approved under § 170.270 of this chapter, or quick acting hinged watertight doors (Class 1) approved under the same subpart if the sill of the watertight door is—
- (1) Installed below the bulkhead deck; and
 - (2) Greater than 24 inches above the final waterline as shown by the calculations required by § 174.310 in each damage condition up to and including the maximum amount of assumed damage.

[CGD 76-080, 54 FR 36977, Sept. 6, 1989, as amended by CGD 95-072, 60 FR 50468, Sept. 29, 1995]

§ 174.340 Collision bulkhead.

Each hopper dredge must have a collision bulkhead that is located not less than 5 percent of the length abaft of the forward perpendicular.

Subpart J—Special Rules Pertaining to Dry Cargo Ships

SOURCE: CGD 87-094, 58 FR 17320, Apr. 1, 1993, unless otherwise noted.

§ 174.350 Specific applicability.

This subpart applies to each new ship of 500 gross tons or over, as calculated by the International Convention on Tonnage Measurement of Ships, 1969, designed primarily for the carriage of dry cargoes, including roll-on/roll-off ships and integrated tug and barges (ITBs) when operating as a combined unit.

§ 174.355 Definitions.

New ship means a ship:

- (1) For which the building contract is placed on or after February 1, 1992; or
- (2) In the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after August 1, 1992; or
- (3) The delivery of which is on or after February 1, 1997; or
- (4) For which application for reflagging is made on or after February 1, 1997; or
- (5) Which has undergone a major conversion:
 - (i) For which the contract is placed on or after February 1, 1992; or
 - (ii) In the absence of a contract, the construction work of which is begun on or after August 1, 1992; or
 - (iii) Which is completed on or after February 1, 1997.

§ 174.360 Calculations.

Each ship to which this subpart applies, must meet the minimum standard of subdivision and damage stability required for that ship by the International Convention for the Safety of Life at Sea, 1974, as amended, chapter II-1, part B-1. Compliance with the applicable requirements must be demonstrated by calculations and reflected in information on loading restrictions, such as a maximum height of the center of gravity (KG) or minimum metacentric height (GM) curve that is part of the stability information required by § 170.110 of this chapter and Regulation 25-8 of The International Convention for the Safety of Life at

§ 174.360

46 CFR Ch. I (10–1–98 Edition)

Sea, 1974, as amended, chapter II-1,
part B-1.

INDEX

SUBCHAPTER S—SUBDIVISION AND STABILITY

EDITORIAL NOTE: This listing is provided for informational purposes only. It is compiled and kept up-to-date by the Coast Guard, Department of Transportation.

A

Part, Subpart, or Section

Addresses:

Material incorporated by reference	170.015
Merchant marine technical offices	170.100
Aft peak bulkhead, passenger vessels	171.090
Alterations	170.001(b), 170.005
Auxiliary sailing vessels:	
Defined	170.055(a)
Large passenger vessels	171.055
Small passenger vessels	171.035
Weather criterion for	170.170(c)

B

Ballast, fixed. (See Fixed ballast.)

Barges:

Deck cargo	Part 174, Subpart B
Definitions	170.055(b), (o), (q)
Large passenger	171.045
Oceanographic research	173.070
Small passenger	171.020
Tank. (See Tank barges.)	
Weather criterion for	170.160
Bulk cargo vessels, special requirements for	Part 172
Buoyancy:	
Air tanks	171.070(d), 171.095(c)
Foam flotation material	170.245
Internal	171.070(d), 171.095(c)
Standards of flooding	171.017

C

Calculations:

Samples of, in stability booklet	170.110(d)
Submittal of	170.090
Stability text results	170.175(a)
Catamarans	171.035(b), 171.057
Center of gravity:	
Determination of	Part 170, Subpart F
During simplified stability test	171.030(c)(4)
Estimated position on tank vessels	170.200
In stability booklet	170.110(d)
Subchapter O barges	172.090(b)
Tanks	170.075(a)(5)
Virtual increase of	Part 170, Subpart I
Collision bulkhead:	

46 CFR (10–1–98 Edition)

Oceanographic research vessels	173.075, 173.085
Passenger vessels	170.040, 171.060, 171.065, 171.070, 171.085
Consumable liquids:	
Effect on stability calculations	170.285, 170.290
In lightweight	170.055(i)
Cranes:	
Data required	170.095
Requirements for vessels with	Part 173, Subpart B
Cross curves, required	170.090(b)(3)
Cross-flooding:	
Instructions to the Master	171.110(d)(13)
Liquefied gas carriers, system standards	172.195(g)
Passenger vessels, system standards	171.080(e)
Subchapter O tankships, system standards	172.150(g)

D

Damage stability:	
Liquefied gas carriers, local damage	172.205
Liquefied gas carriers, major damage	172.170
MODU's, standards for	174.065
Nautical school ships, standards for	173.055, 173.080
Nuclear powered vessels, standards for	174.120
Oceanographic research vessels, standards for	173.080
Oil tankers, standards for	172.065
OTEC facilities, standards for	174.155
Passenger vessels:	
Cockpits	171.145(e)(3)
Types I and II	171.080
Types III	171.082
Well decks	171.150(b)(2)
Subchapter D tank barges carrying cargoes other than oil	172.050
Subchapter O barges, standards for	172.103
Subchapter O tankships, standards for	172.133
Dangerous cargoes	Part 172, Subparts E and F
Dead covers:	
Oceanographic research vessels, required	173.085(k)
Passenger vessels, required	171.117, 171.119(a)(2), 171.122(g)
Deadweight surveys	170.175(c)
Deck cargo barges. (See Barges.)	
Definitions:	
Concerning a vessel	170.055
General terms	170.050
Pertaining to lifting	173.010
Pertaining to liquefied gas carriers	172.160
Pertaining to MODU's	174.035
Pertaining to passenger vessels	171.010
Pertaining to Subchapter O tankships	172.127
Discontinuous bulkhead deck, passenger vessels	171.015(c)
Discontinuous weather deck	170.170(b)
Double bottoms, passenger vessels:	
Manholes in	171.108
Permeability of	171.066(b)(4)
Required	171.105
Watertight floors in	171.109
Wells in	171.106
Downflooding:	
Angle	170.055(f)

Index, Parts 170–174

Deck cargo barges.....	174.015
Defined (except MODU's)	170.055(e)
Lifting vessels	173.020(b)
Liquefied gas carriers	172.195
Mobile offshore drilling units (MODU's):	
Considered.....	174.045
Defined.....	174.035(b)
Oil tankers	170.055(f)
Sailing passenger vessels	171.055
Subchapter O barges	172.090
Subchapter O tankships	172.150
Tugboats and towboats	174.145
Vessels of unusual proportion and form	170.173
Vessels which tow	173.095
Draft marks	170.075(a) (6), 170.180(e)
Drainage of weather decks.....	Part 171, Subpart H
Deck cargo barges	Part 174, Subpart B

E

Equalization. (See Cross-flooding.)	
Equivalent plane bulkhead, passenger vessels:	
Defined.....	171.010(c)
Required:	
Type I subdivision	171.067(f)
Type II subdivision.....	171.073(c)
Equivalents.....	170.010
Estimated lightweight vertical center of gravity.....	170.200
Existing vessels	170.001(b)

F

Ferry:	
Collision bulkheads	171.040(d), 171.060(d)
Defined	171.010(d)
Intact stability during loading.....	171.030(g)
Fixed ballast.....	170.055(i), 170.110(d) (14), 170.235
Floodable length:	
Curves required.....	170.090(b) (4)
Defined.....	171.010(e)
Passenger vessels:	
Simplified—small passenger vessels	171.043(a)
Standards, Type I	171.065
Standards, Type II	171.070
Standards, Type III	171.075
Floors, watertight—in double bottoms.....	171.109
Foam flotation	170.245, 171.070(d), 171.095(c)
Foreign vessels	170.001(a) (2)
Freeboard:	
Allowable heeling limits, general	170.170(a), 171.030(e)–(h)
Passenger vessels, effective	171.043
Freeing ports:	
Minimum Area.....	171.150
Required	171.135
Free surface:	
Instructions concerning:	
Counterballasting	170.125(b) (1)
Stability booklet	170.110(d) (6)

46 CFR (10–1–98 Edition)

Subchapter O tank barges, assumption	172.087(b)
Treatment of, general	Part 170, Subpart I

G

Grain in bulk.....	170.098, Part 172, Subpart B
“Grandfathering”	170.001(b)

H

Hazardous liquids	Part 172, Subparts E, F
Hopper barges:	
Subchapter D cargoes other than oil	172.050
Subchapter O cargoes	172.100, 172.110
Hydrostatic curves (curves of form), required	170.075(a)(3), 170.100(d)(4)

I

Inclining experiments. (<i>See</i> Stability test.)	
Incorporation by reference:	
General	170.015
IMO Resolution A.265(VIII)	170.135, 171.075, 171.082
MIL–P–21929B.....	170.245(b)(9)
Intact stability:	
Deck cargo barges.....	174.015, 174.020
Large passenger vessels:	
Catamarans	171.057
Passenger heel.....	171.050
Sailing.....	171.055
Lifting vessels.....	173.020, 173.025
Liquefied gas carriers	172.165
Mobile offshore drilling units (MODU’s)	174.045
Passenger vessels:	
Cockpits	171.145(e)(1)
Well decks	171.150(b)(2)
Small passenger vessels:	
General.....	171.030
Sailing.....	171.035
Subchapter O barges	172.090, 172.095
Tugboats and Towboats	174.145
Vessels of unusual proportion and form	170.170(d), 170.173
Weather Criterion.....	170.160, 170.170
International voyage:	
Passenger vessels:	
Aft peak bulkhead required	171.090(a)
Defined	171.010(g), (1)
Double bottoms required for	171.105(a)
Shaft tunnels	171.100(a)
Special considerations	171.068
Standards	171.045
Subdivision requirements	170.265(d)(1)
Watertight door requirements.....	170.265(d)(1)

L

Large Passenger vessels	Part 171, Subpart C
Lifting:	
Data submittal requirements	170.095
Operating information requirements.....	170.125

Index, Parts 170–174

Standards.....	Part 173, Subpart B
Lightweight:	
Defined	170.055(i)
Information required, stability booklet	170.110(d)(1)
Determination of	Part 170, Subpart F
Lines drawing required.....	170.075(a)(2), 170.180(a)
Liquefied flammable gas, barges.....	Part 172, Subpart C
Liquefied gas carriers	Part 172, Subpart G
LNG Carriers. (See Liquefied gas carriers.)	
Load line:	
Certificate, stability information on.....	170.110(e), 170.120(b)
Length, defined.....	170.055(h)(5)
Locks required:	
Cargo space watertight doors	170.275(b)
Port lights below the bulkhead deck.....	171.116(f)(4)

M

Machinery space bulkhead, passenger vessels	171.095
Main transverse watertight bulkhead.....	170.055(j)
Manholes, passenger vessels:	
Double bottoms.....	171.108
Prohibited locations.....	171.111(h)
Margin line:	
Passenger vessels:	
Air tankage or internal buoyancy	171.070(d)(2)
Dead covers required on port lights, below.....	171.117(a)
Location of.....	171.015
Location of openings	171.111(f), (g)
Openings in trunks.....	171.113(c)(2)
Stepped bulkheads	171.067(b)(3)
Submergence of.....	171.017, 171.080(d)(3), 171.100(b)
Volume below	Tables 171.065(a), 171.066, 171.068
Volume of passenger spaces above	171.065(b)
Watertight integrity above	Part 171, Subpart G
Test head:	
Form flotation material	170.245(b)(3)
Watertight doors.....	170.270(b)
Military specifications, MIL-P-21929B	170.015(b), 170.245(b)
Mobile offshore drilling units (MODU's):	
Operating information required.....	170.130
Stability information required.....	170.110(a)
Standards for	174.005(b), Part 174, Subpart C

N

Nautical school ships, standards	171.001(b), 173.001(b), Part 173, Subpart C
Nuclear powered vessel, standards	171.001(b), 174.005(c), Part 174, Subpart D

O

Oceanographic vessel, standards	171.001(b), 173.001(c), Part 173, Subpart D
Oil in bulk, standards for vessels carrying	172.005(c), Part 172, Subpart D
Openings:	
Closed by weathertight covers:	
Liquefied gas carriers.....	172.195
Mobile offshore drilling units	174.045(c)
Oil tankers.....	172.065(g)

46 CFR (10–1–98 Edition)

Subchapter O tankships	172.150
Downflooding through:	
General	170.055(e), (f)
Mobile offshore drilling units	174.035(b), 174.065(a)
Subchapter O barges	172.090(d)
Sailing passenger vessels	171.055(f)
Mobile offshore drilling units:	
Closures for	174.100
Watertight, closed automatically	174.015(b)
Watertight, closed rapidly	174.045
Passenger vessels:	
Cockpit openings	171.145(a)(2)
Collision bulkhead	171.085
Effect on effective freeboard	171.043(b)
Special consideration, exposed weather decks	171.122(f)
Vessel sides	Part 171, Subpart F
Watertight bulkheads	Part 171, Subpart E
Watertight, closed automatically:	
Mobile offshore drilling units	174.015(b)
Towing vessels	173.095(e)
Operating manual	170.130
OTEC facilities	174.005(e), Part 174, Subpart F

P

Passenger vessels, standards	Part 171
Penetrations. (See Openings.)	
Permeability	
Calculation of, Type I subdivision	171.066
Damage stability:	
Liquefied gas carriers	172.185
Mobile offshore drilling units	174.090
Oil tankers	172.065(f)
Passenger vessels	171.080(c)
Subchapter O tankships	172.140
Defined	170.055(k)
Uniform average permeability:	
Type I subdivision	Table 171.068
Type II subdivision	171.072
Plans:	
Approval:	
General	Part 170, Subpart C, 170.180
Required	170.075
Specific	170.093
Submittal of	170.100, 170.180
Port lights	171.116

R

Repairs:	
General	170.001(b), 170.005
In way of fixed ballast	170.235(b)
Roll stabilization tanks	170.295
Rudders, towline pull criterion	173.095

S

Sailing vessels:

Index, Parts 170–174

Defined.....	170.055(a), (1)
Intact stability standards:	
Catamarans	171.057
Large passenger vessels.....	171.055
Small passenger vessels	171.035
Weather criterion	170.170(c)
School ships. (See Nautical school ships.)	
Shaft power, towline pull criterion	173.095
Shaft tunnels:	
On passenger vessels	171.100, 171.106(c)
Watertight doors in	170.260(d)
Short international voyages, vessels on:	
Class 3 doors	170.265(d)(1)
Defined.....	171.010(1)
Double bottoms not required.....	171.105(h)(2)
Special considerations.....	171.068
Side ports, passenger vessels	171.118
Sister vessel, stability test dispensed with	170.175(c)
Small passenger vessels, standards.....	Part 171
Stability booklets:	
Contents of	170.110
Lifting vessels, additional information	170.125
Submission and approval required.....	170.080
Vessels with Type III subdivision, additional information.....	170.135
Stability letters:	
In lieu of stability booklet	170.110(e)
Required	170.120
Stability test:	
General	170.175
Information required before test	170.085
Plans and information required at test	170.180
Preparations for test	170.185
Simplified test, small passenger vessels.....	171.030, 171.035
Test procedure, modification of.....	170.190
Stern tubes, passenger vessels	171.100
Subdivision:	
Nuclear powered vessels, requirements	174.115, 174.125
Oceanographic vessels	173.075, 173.085
Passenger vessels:	
Additional requirements	Part 171, Subpart D
Calculations:	
Type I.....	171.065, 171.066, 171.067, 171.068
Type II.....	171.070, 171.072, 171.073
Type III	171.075
Requirements, large passenger vessels.....	171.060
Requirements, small passenger vessels.....	171.040
Trunks, effect of.....	171.113(b)(3)
Subdivision load line (draft), passenger vessels:	
Cockpits	171.145(e), (f)
Dead cover locations	171.117(b)
Deepest, defined.....	171.010(b)
Openings in hull, small passenger vessels	171.119(a)
Port light locations	171.116(b)(2)
Transverse damage extent, relationship to	171.065(h)(2), Table 171.080(a)
Ventilators and side port locations	171.118(c)
Superstructures:	
Buoyancy of:	

46 CFR (10–1–98 Edition)

Liquefied gas carriers	172.195(e)
Oil tankers.....	172.065(h)
Subchapter O tankships	172.150
Integrity of, mobile offshore drilling units	174.100(b)
Points of downflooding in:	
General.....	170.055(e)
Mobile offshore drilling units	174.035(b)(1)
Port lights in, oceanographic vessels.....	173.085(k)
Windage area of, small passenger vessels	171.030(d)

T

Tank barge:	
Assumed center of gravity for	170.200(b)(2)
Carrying oil in bulk	Part 172, Subpart D
Carrying Subchapter D cargoes other than oil	Part 172, Subpart C
Carrying Subchapter O cargoes.....	Part 172, Subpart E
Defined	170.055(o)
Tank vessel:	
Assumed center of gravity	170.200
Defined	170.055(n)
Standards for	Part 172, Subparts C, D, E, F, G
Tests:	
Foam flotation material.....	170.245
Passenger vessels:	
Operational, sailing vessels	171.035(f)
Simplified stability test, small passenger vessels.....	171.030, 171.035
Stability.....	170.085, Part 170, Subpart F
Watertight doors.....	170.270
Towboats. (<i>See</i> Towing.)	
Towing, standards for... 173.001(d), Part 173, Subpart E, 174.005(d), Part 174, Subpart E	
Towline pull criterion.....	173.095
Tugboats. (<i>See</i> Towing.)	

U

Unusual proportion and form, vessels of.....	170.173
--	---------

V

Ventilators, automatic—passenger vessels.....	171.118
---	---------

W

Watertight bulkheads:	
Doors, standards for.....	171.122, 171.124, Part 170, Subpart H
Liquefied gas carriers	172.175, 172.195
Mobile offshore drilling units	174.080, 174.085
Oceanographic vessels, ducts through	173.085(o)
Oil tankers.....	172.065
Passenger vessels:	
Above weatherdeck	171.122
Large passenger vessels, requirements	171.065, 171.067, 171.068, 171.070, 171.073
Machinery space.....	171.095
Penetrations of.....	Part 171—Subpart E
Small passenger vessels, requirements	171.040, 171.043
Watertight floors	171.109
Subchapter D barges not carrying oil.....	172.050

Index, Parts 170–174

Subchapter O barges	172.104
Subchapter O tankships.....	172.133(d), 172.150
Watertight doors. (<i>See</i> Watertight bulkheads.)	
Weather criterion.....	Part 170, Subpart E
Wind heeling moment:	
Small passenger vessels.....	171.030(d), 171.035(g)
MODU's.....	174.035(b)(2), 174.045, 174.055, 174.065(a)(2), 174.100(d)(2)